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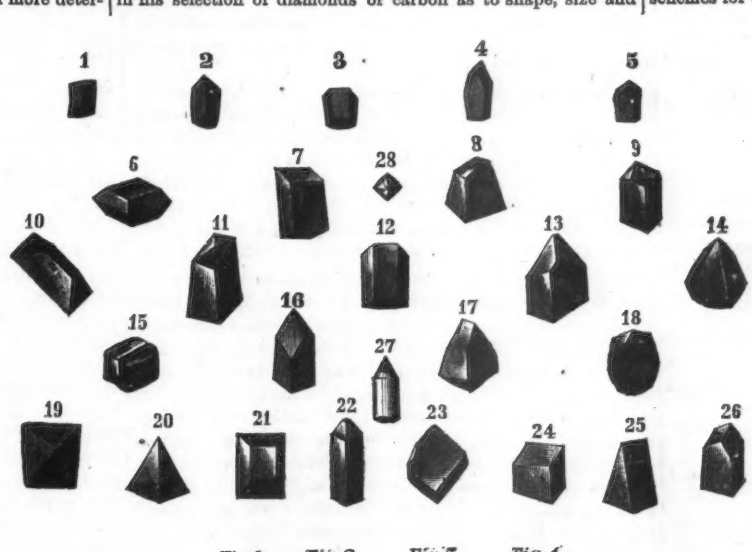
Dickinson's Patent Shaped Diamond Carbon Points or Cutters, and Adjustable Holder.

THE hardness of the diamond as compared with steel long ago led to its preference for doing work where durability of a cutting edge and accuracy were required. They have also of late years been used for sawing, dressing, drilling and turning stone on an enlarged scale, but the cost has been a great drawback to its extended usefulness, and has led to the adoption of Diamond Carbonate as a substitute, which stands the severest test for various mechanical purposes, without apparent wear, especially where there is considerable friction, and when the hardest steel cutter will not hold an edge. Their being used for grinding and shaping diamonds and other gems, proves it to be the hardest known substance and an invaluable acquisition (when shaped) to engineers, quarrymen, machinists, and for working all kinds of stone, emery wheels, conglomerates, etc. The comparative recent discovery of this valuable mineral in the same mines with diamonds, and its recent adoption in the mechanic arts, has attracted the attention of scientific men, as well as the most experienced judges, workers, and dealers in precious stones. Their general impressions seem coincident, (*as it exists*), that it is the real matrix of the diamond, possessing all the components of the latter in its granular stage of formation; being opaque, of a black or gray color, round or irregular in shape, with no defined cutting edges.

The limited knowledge possessed by mechanics of diamonds or carbon and their nature, as well as skill requisite in setting them properly, it was necessary to shape them in more determinate forms, as represented in the accompanying engraving. By the conformation of these points, giving them a wedge or other distinct shapes, any mechanic of ordinary skill can set them in dove-tail seats or grooves made to correspond, or on the principle of clamping the same as described by the patent adjustable holder. Carbon, having more of a *grinding* than *cutting* nature, a perfect sharp edge like that produced with steel or diamond, being impracticable and not desirable, although to do good work their general form must approximate to the steel point used for the same purpose.

The cuts illustrate both the Carbon Points and the adjustable Clamp Tool employed for holding them. Any mechanic by the assistance of the above tool can substitute or change them with great facility in less than five minutes, by inserting these points into cavities and secure them by drawing the longitudinal jaws or hinged clamps, A. A. together by screws B. B. The advantages of this tool, together with the Diamond and Carbon Points, are manifold, by making one answer numerous purposes. It is simple, easily handled, and by the use of the Diamond or Carbon Points great regularity and certainty is obtained. The saving of time, money and labor in continual sharpening of ordinary steel tools, is of itself no small item in their favor, besides that, they will do what the former cannot.



Our engraving shows an enlarged representation of some of the various forms to which diamond or carbon are ground. Points Nos. 1, 2 and 3 are shaped carbon used for working, turning, grind and other kinds of stones, conglomerates, such as emery wheels, etc. Their illustration will give some idea as to their general size and rough finish as compared with steel or diamonds, for reasons before given. No. 4 is a diamond point with angles of 60°, used for dividing on metal or turning out screw taps, etc. No. 5 is a Diamond Barley Corn Cutter, used by watch and pencil-case makers, etc. No. 6 is a Carbon Double-sided Trapezoid, used in various positions for marking or working stone. No. 7 is a Diamond Chisel Point for turning metal. No. 8 is a Carbon Drill parallelogram faced for pointing combination drill-heads for stones. No. 9 is a Diamond quadrangular prism. No. 10 is a Carbon truncated prism for stone. No. 11 is similar to No. 8. No. 12 is a Carbon truncated prism for facing or edging ring or cylinder drills, saws, etc., for stone. No. 13 is a Carbon quadrangular drill-point for stone. No. 14 is a Carbon reamer for stone, etc. No. 15 is a Carbon Block, and used for the same purpose as No. 12. No. 16 is a Diamond Graver for metal, etc. No. 17 is a flat octahedron Carbon Drill Point for stone, glass, etc. No. 18 is a flat ovoid used for the same purpose. No. 19 is a Carbon tetrahedron used the same as Nos. 10 and 12. No. 20 is a pyramidical Diamond Point. No. 21 is a Carbon truncated prism. No. 22 is a Diamond-pointed reamer. No. 23 is a Carbon flat-pointed Drill. No. 24 is a Diamond chisel point. No. 25 is a Diamond double-inclined plane wedge. No. 26 is a Carbon quadrangular wedge for turning stone, etc. No. 27 is an acute conical turned Diamond Point for engraving and etching on steel, etc. No. 28 is a Diamond in its natural crystallized hexahedron form as found in the mines. The above illustrated Diamond and Carbon Points or Cutters range in size from one-sixteenth to 10 carats each (a carat is equal to four grains). Their perfectness of finish depends upon the purpose and material to which they are to be applied.

These points or cutters can also be set into any tool, by grooving out the metal to correspond with their shape, the metal being bushed around it and then secured by coppersmith's solder. Carbon being exceedingly hard and brittle, will not stand a shock or blow, but any amount of friction.

Diamonds, as well as carbon, are rapidly growing into favor among stone-workers, machinists and others, for the purposes herein enumerated, viz., for drilling, reaming, sawing, turning, planing, shaping, carving, engraving and dressing agates, grind, Arkansas and other stones, nickel, iridium, enamel, crystal, porcelain, etc., also for turning up emery wheels, paper calendar rollers, screw taps, etc. The manufacturer has on hand a large assortment of diamond or carbon points and cutters of various sizes and shapes, and is prepared to make them of any form required. He also has the largest and finest assortment of diamonds and crude crystallized carbon ever imported to this country. By experience as a manufacturer of glaziers' diamonds, and in setting diamonds or carbon, for drilling rocks, sawing and dressing various kinds of stone, and other mechanical purposes, he feels confident he can give satisfaction in his selection of diamonds or carbon as to shape, size and quality required to all parties who may entrust their orders to his judgment.

Parties wishing to point, edge or face turning tools, drills or cutters, etc., with any particular shape or size, diamond or carbon, will facilitate the execution of their orders by sending models of the same in wood, brass or other soft metal, together with models or drawings of the holder in which they are to be set; also please explicitly state the purposes for and method in which the tool is to be used or applied. The price will be in accordance with shape, size, weight, finish and quantity.

Any further information will be cheerfully given by the inventor, JOHN DICKINSON, No. 64 Nassau street, New York.

Interoceanic Canal.

THE idea of an American interoceanic ship canal dates back to COLUMBUS and CORTEZ, and their immediate successors. COLUMBUS sailed from Palos for the eastern shores of Asia, and died in the belief that he had reached them, instead of discovering a mighty barrier between European commerce, and a yet greater ocean. CORTEZ, DE SOTO, HUDSON, the CABOTS, BALBOA, MAGELLAN, and their cotemporary explorers, devoted their energy and daring, less to the survey and settlement of the world they had found, than to the search for a natural waterway through it, that they might continue their interrupted voyages to Cathay and Zipangu (China and Japan). Failing in this, CORTEZ himself was the first to project and urge upon the attention of CHARLES V. the construction of an artificial strait to supply the obvious deficiencies of nature. We quote from a late article by an American Fellow of the Royal Geographical Society, published in the *American Journal of Science and Art* (Silliman's), November, 1860:—"Ships were built on the Pacific side, but with many of the materials carted over from the Goatzacoalcos river. All the details of this scheme, from the 15th of May, 1522, to the 15th October, 1524, are recorded in CORTEZ's Fourth Relation to the Emperor, printed at Toledo October 20th, 1525. This Relation in Spain, with the reports of ALVARADO and GODOY attached, gave still another impulse to the new speculations and enterprises, as it showed not only the practicability, but the probability of opening, by artificial means, a direct route to the Orient, in a low latitude and good climate. CORTEZ was clear-headed and far-sighted enough to see that lines of commerce must be straight lines, and that the curves of the capes in high latitudes are only matters of temporary necessity. Indeed, so sanguine was CORTEZ on these points, that he planted his personal hopes and private fortune on and near this isthmus, as likely to become the Old World's highway for Oriental commerce. All the lands and private estates selected for himself and his posterity, and confirmed to him, in 1529, by the Emperor, were located here in the Valley of Oaxaca, and near Tehuantepec. He was ennobled in 1529, taking his title, Marquis del VALLE, from his possessions chosen here. To this day they are called the Cortez Estates, or the Marquisanas. He and his kinsman, SAAVEDRA, had vast schemes for opening communication, by means of a ship canal or Roman road, for the transportation of merchandise brought hither from the Moluccas and other parts of the East for passage or transhipment to Spain."

Machine for Rolling and Shaping Metals.

AN improved machine for rolling and shaping metals has recently been invented in England. The object of this invention is to provide a machine whereby axles and such like articles of round section and varying diameters can be speedily and economically rolled or formed lengthwise into the desired shape. For this purpose three or more rolls are employed, whose axles are parallel to each other. The rolls are geared together so as to rotate in the same direction, or two or more of them are left free to rotate, but in all cases they are so disposed that there is a space between their peripheries to receive the metallic blank from which the axle or other article is to be formed. Their surfaces may have any desired patterns thereon. The blank is placed between the rolls with its axis parallel to theirs. By rotating the rolls and gradually bringing them closer together, the blank is also caused to rotate on its axis, and assume a negative outline of the rolls. To form well-defined shoulders, bearings, or other articles, sliding collars or portions of rolls are fitted to move laterally with the blank at the time they are giving pressure.

Estimation of the Total Quantity of Carbon Contained in Iron.

DR. WITTSTEIN first states that the method suggested for the estimation of carbon in iron (crude cast-iron) by the late M. BERZELIUS, is the best and most simple. It consists in treating the iron with chloride of copper. The author's experiments with this method were conducted as follows:—1.25 grms. of coarsely pulverized iron were added to a liquid contained in a flask, and consisting of 50 grms. of water, 10 grms. of chloride of sodium, and 10 grms. of sulphate of copper. The iron was left in this solution for a couple of days. Ten grms. of hydrochloric acid, sp. gr. 1.13, were then added. The flask was next heated on a sand-bath. By this operation the hydrated oxide of iron and the finely-divided metallic copper were dissolved, and after the liquid had been diluted with about twice its bulk of water, the carbonaceous matter was collected on a previously weighed filter, and dried at 100°. The quantity obtained weighed 0.097 grm., losing by ignition a quantity of 0.042 grm., which amounts to 3.36 per cent of carbon. The residue of the ignition was tested for the presence of iron and copper by dissolving in nitro-hydrochloric acid (*aqua regia*). Both metals, to the amount of one centigrm., were found to be present; the remaining silica was still found to contain a small quantity of carbon.

CANADIAN TELEGRAPHY.—Canada has now 2,000 miles of telegraphic wire, and the number of her telegraphic offices is 675. The wires are carried on cedar poles 25 feet to 30 feet high.

On the Sewage Question.

Paper read before the Glasgow Philosophical Society (Sanitary Section), Nov. 9th, 1870, by EDWARD C. C. STANFORD, F. C. S.

[Continuation.]

Now, in estimating the value of a manure, Her Majesty's Commissioners attach little importance to farmers' certificates, but value it entirely by chemical analysis; this is the only fair way, because it shows exactly what it is worth in open market. But in comparing the value of irrigation with that of any other chemical process dealing with sewage, they bring in another, and, I submit, an improper element, *i. e.*, the total profit of the farmer. This is unfair; the farmer buys his manure—say, made from bones, or, say, from excreta—by analysis at its market value, and his living is made out of what that investment produces from the land. The irrigationists have no right to put themselves in his place, reap his profits, charge themselves nothing for the sewage, and call that "making it pay." In one of the accounts quoted in Her Majesty's Commissioners' Report, I see the "right of shooting over the farm" actually entered as an irrigation profit! What will the farmer give for the sewage? Of course, much less than its analytical value, where, as with us, the water is not wanted. Farmers in the west of Scotland, although, no doubt, they can grumble as well as their English friends, very seldom have to grumble for want of water; and, at any rate, in their case, the value of the manurial matter will be in inverse geometrical proportion to the quantity of water it is dissolved in. I repeat geometrical, not arithmetrical.

Our country has got into its sewage difficulties from the extreme persistence with which our engineers have clung to the idea that water is the great purifier. Hence, we began with the water-closet, combined with a cesspool, but the frightful results of this provision for the contamination of our drinking water were soon apparent. We could not stop there, we must go further, and convert the cesspool into a net-work of gigantic sewers.

Instead, therefore, of having one deep cesspool for each house, exposing a comparatively small surface, we now convert these into one shallow stream of large surface and underlying the whole city. Therefore, we can have no more wells; we must draw our drinking water from one great source far away from contamination.

Prof. CORFIELD says our sewers must be porous to the drainage water above, and impervious below. Practically we all know that all leak above and below, the sewer gases diffuse upwards, and the sewer liquids find their way downwards.

Sewage will pass easily through brick walls, and the action of the sewage on the soil pipes diffuses them throughout the house. The British Association Committee says that no improvement has taken place in sewer ventilation.

I spoke of water in a former paper as "a mere carrier" of excretal matter; we find it now a most powerful diffuser, spreading far and wide its pollution.

It is idle to talk of carrying the sewage without decomposition to the land. Both the solid and fluid excreta are acid when voided; the former will remain several weeks without decomposition, and the latter several days; mix them or add water, and the mixture becomes alkaline in twenty-four hours, and in that time it absorbs rapidly, and is in a full state of decomposition. Again, the gases given off from this mixture are of the most dangerous character—light carburetted hydrogen is one; and this is one of the most diffusive gases with which we are acquainted, and we cannot keep it and the poison germs which it diffuses out of our houses. The sickly odor of sewer gas is too well known in all houses where there are water-closets.

Now I am quite prepared to admit that the water supply and the drainage arrangements are good and may be left for house-washing waters or surface drainage, and the slight amount of oxidation from the surface of the river may be sufficient to purify this. But when we look at this gigantic scheme as a scientific means of removing that small portion of dirt we call house-sewage, I say that our sanitary reformers have been looking at it through a water medium, and therefore seen it highly magnified. I only wonder that they have stopped here, and not always insisted on the removal of our house-ashes by the same means; the amount to be removed is about the same, and it would not pollute the water.

Let it not be supposed that the water-closet can ever be universal; all its evils are aggravated in hot climates, and in very cold climates it is impossible. The bursting of a soil-pipe in a dwelling house is a calamity which would soon put a stop to the use of the closets if it occurred often with us. Even Professor CORFIELD admits that the water-closet ought always to be ventilated by a window or an outside wall, and all know that a water-closet in a sick room, in connection with a main sewer, would be highly dangerous.

The healthfulness of irrigated fields is a much disputed question, but Professor CORFIELD easily dismisses it. I must, however, quote Dr. SPENCER COBBOLD, F. R. S., as the highest authority on the subject. In a pamphlet on "A New Entozootic Malady arising from the Utilisation of Sewage," he says: "The wholesale distribution of tapeworm eggs by the utilisation of sewage on a stupendous scale will inevitably tend to spread abroad a class of diseases, some of which are severely formidable."

He states that, in Egypt, one-third of the population suffer from a small parasite in the blood; that this disease (Helminthiasis) is "terribly fatal," and that it has already been found by Dr. HARLEY in this country. He states his conviction that it is quite possible "twenty years hence, this parasitic malady may be as prevalent in this country as it is now known to be in particular sections of the African continent." Coming from such an eminent authority, the pamphlet presents a sufficiently terrible picture to make any sanitary reformer pause and consider if the country should be committed to even the bare possibility of such awful visitations. If many of our Ayrshire friends peruse it, they will resist the threatened inundation of Glasgow tape-worms as they would the most terrible army of invaders. And yet my friend Mr. HOPE, V. C.,* of the British Association Irrigation Committee (and the most committed to irrigation), has the pluck to suggest "a convalescent hospital for diseases of the chest in the middle of his sewage fields, guaranteeing to the patients a certain number of irrigations in the month with genuine unadulterated London sewage," "where London beauties might come out to recruit their wasted energies at the close of the season, and, attired in a *costume de circonstance*, with coquettish jack-books, would, perhaps, at times, listen to a lecture on agriculture from the farmer himself while drinking his cream and luxuriating in the health-restoring breeze." The pictures are somewhat different; Dr. COBBOLD would, probably, consider this seeking the "diet of worms." The distinguished advocate of sewage irrigation is not the only "Hope" that has "told a flattering tale." On the other hand, Professor CORFIELD states that phthisis is greatly decreased by efficient drainage, *i. e.*, I suppose, increased by irrigation swamps.

In carefully reviewing the effects and defects of water carriage, I have been forcibly led to consider that to dry up the excreta is the safest, easiest, and best method of removal; it certainly is the only one by which we can ever expect to realise its full value. Now let us examine what these reports have to say against it.

I scarcely know how to criticise the Royal Commission Report on this subject, because their objections apply only to the ash-pit and privy system as carried out in Lancashire, and we must agree with their conclusions, but the evidence does not in the least effect a proper dry closet system such as that I propose. In fact, they speak highly of some places where MOULE's earth closets are used.

Professor CORFIELD, in speaking of the earth closet, admits that "with supervision the closets do not get out of order," but he has to admit, also, that they had to be substituted for water-closets, at "Dorset County School, because the water-closets always got out of order from things being put into them, and from the apparatus being broken," which, he says, was "because they were not simple and self-acting." But Dr. BUCHANAN describes the effect of the change as to have actually reduced the cost of keeping of from £3 to 10s. per annum, and to produce manure worth 15s. per head per annum (which, however, Professor CORFIELD does not believe possible). A low fever, which visited the town two years following, never entered the school. The simple water-closets he recommends are used at Liverpool, but the supervision is undertaken and the rules enforced by the sanitary authority.

In one of the largest cotton mills in Scotland, the owners were obliged to give up the use of water-closets on account of their offensiveness. The cost of the pure water for the closets was £70 per annum; which was worse than lost, as it was returned to foul a pure stream. Dry closets have been substituted, the offensiveness indoors is entirely removed, the purity of the stream is maintained, and the product of the closets realise £150 per annum. Can any evidence be stronger?

As regards pollution of rivers, Dr. FRANKLAND has shown by numerous comparative analyses that the sewage of so-called midden towns is even stronger than that of towns where water-closets are universal. Now this is a result which cannot surprise us when we remember that in all these towns the fluid excreta goes into the sewers; *i. e.*, eight-ninths of the pollution, and unaccompanied by the large dilution of water from the closets. In fact, he adds, "connected as the middens usually are with the sewers, no inconsiderable proportion even of solid excrement, partly in solution and partly in suspension, does actually find its way into the sewerage system." One of the British Association reporters instanced a town where the excreta was collected in ashes and then carted out to repair the roads. I need scarcely say that this is not the dry system we advocate, and I admit at once that if the urine is not to be collected, the dry system is a failure. Moreover, in all the midden towns referred to, from admixture with a large quantity of valueless material, a considerable amount of manure of a poor value is produced; the highest of which, that of Salford, only realizes 7d. per head per annum, and 1s. 8d. per ton, and in all cases the cost exceeds the produce.

Glasgow is better than this, say 2s. 6d. per ton, and 2s. per head. But even here, from the enormous quantity of ashes mixed with it, the police manure is obliged to be sold at a low price on account of the carriage. The whole system of removal is, however, infamous, and must be highly prejudicial to health. The mistake lies in the material used; instead of being the cheapest and most bulky, it should be the dearest and the least bulky. It is in this direction that I complain of there having been no investigations; we have a large choice of deodorisers, if we deal direct with the material, and without the intervention of water. For while the advocates of a wet system must necessarily use water, those who advise a dry system are not confined to the use of earth, which may not in the end be the cheapest.

The best is, I believe, what I have introduced under the name of X-charcoal, or charcoal derived from carbonised excreta. The quantity required is less than a quarter the amount compared with earth, and every city has its own source of supply; thus the two constant objections to the earth system, are at once done away with.

In each of the closets I have a small earthenware urinal with a tube passing under the floor connected with the pan of the closet, and into this the chamber urine of each floor is emptied (this is kept entirely free from odor by two or three good sized pieces of wood charcoal). The total quantity to be dealt with is easily estimated, but as my former estimates, based on LIEBIG's estimate, differ from those adopted by Her Majesty's Commissioners, I append comparative statement, and also that of Prof. PARKES, a high authority.

FOR 100,000 PERSONS, AVERAGE OF ALL SEXES.

	Weight in cwts.			Value in £.	
	Liebig.	Parkes.	H.M.C.	Liebig.	H.M.C.
Fæces	78,000	50,919	64,937	5,800	4,263
Urine	484,000	814,732	840,637	35,800	28,140
Total	562,000	865,651	905,574	41,600	32,403

PER HEAD PER ANNUM.

	Weight in cwts.			Value in shillings.	
Fæces	0.78	0.50*	0.64	1.16	0.852
Urine	4.84	8.14	8.40	7.16	5.628
Total	5.62	8.64	9.04	8.32	6.480

PER ANNUM.

	Weight in tons.			Value per ton in shillings.	
Fæces	3,900	2,546	3,246	29.74	26.26
Urine	24,200	40,736	42,032	29.54	13.38
Total	28,100	43,282	45,278	29.68	14.31

The calculations of value are mine, and are based on the usual estimate established by the last sewage commission at 8s. 4d. per head per annum as obtained from the analyses of sewage. This was made up on the analyses of Messrs. LAWES and GILBERT, each individual contributing per annum in—

Urine	11.32 lbs. ammonia = 7s. 3d.
Fæces	1.64 lbs. ammonia = 1s. 2¼d.
	8s. 5¼d.

Taking LIEBIG's estimate of one cubic foot per head per annum solid, and 9 cubic feet liquid, rating also the relative value of 1 to 6, making 1s. 2d. per head for the former, and 7s. 2d. for the latter. LIEBIG's estimate allows a margin for loss.

I have calculated the values of Her Majesty's Commissioners' Report by taking the data in the table of the amounts of organic nitrogen and of phosphates, and valuing the former at £68 per ton, and the latter at £15 per ton, the values by which in the same report the manure of the A B C process is estimated.

The following shows the amounts in the table for 100,000 people:—

	Weight in cwts.			Per cent.		
	Organic nitrogen.	Potash.	Phosphates.	Organic nitrogen.	Potash.	Phosphates.
Fæces	957	649	1,347	1.47	1.00	2.070
Urine	7,531	2,521	3,380	0.89	0.30	0.402
Total	8,488	3,170	4,727	0.937	0.350	0.522

It will be seen that the values given only allow 6s. 6d. per head per annum, or 14s. 4d. per ton. The value of the potash which I add to the table is, however, 3,170 cwts. at 20s. = £3,170, and makes the total value = £35,573, or 7s. 1d. (7.114) per head, or 15s. 8d. per ton (15.68).

The magnesia and the other salts would no doubt bring up the value to the usual 8s. 4d., which, even at the high quantities estimated, would give the manure an average value of 18s. 5d. per ton. The outside quantity to be removed, therefore, inclusive of all urine, cannot exceed 9 cwts. per head per annum, and its value cannot be less than 18s. per ton. Now, even at this high estimate, the removal does not exceed that of the house-ashes. Taking the city through, for 500,000 inhabitants, the daily removal would be, at 300 days in the year (225,000 tons per annum), 750 tons. One high authority, Baron LIEBIG, estimates the annual value of the excreta per head (London sewage of 3,000,000 = £4,081,430) at 27s. 2d. This would make the excreta worth 60s. per ton. Even now, however, we find, where the earth system is thoroughly and efficiently carried out, Prof. CORFIELD says the manure realizes "above its possible value," and there can be no doubt whatever that if the profits of the farm are to be added, as in the case of the irrigators, the advantage would be enormously on the side of the dry system.

Taking, however, the lowest compatation, and putting the value of the excreta at 18s. per ton, every one must admit that it will pay to cart it away. X charcoal has a manurial value of £5 per ton, and an average composition—

Chloride of sodium†	4	× 1 =	4
Chloride of potassium	8	× 10 =	80
Phosphate of lime	25	× 15 =	375
Carbonate of lime	5	× ½ =	2½
Carbonate of magnesia	5	× 5 =	25
Carbon	43	× 2 =	86
Silica	10	× ½ =	5
	100		577.5

(Equal to £5 15s. 6d. per ton.)

This manure contains all that is necessary for plants except nitrogen. The effect of mixing one ton of it with one ton average excreta, is to obtain when dry 25 cwts. of manure having nearly the above composition, with the addition of nitrogen = 6 per cent. sulphate of ammonia, and worth £6 per ton. The total gain being 25 cwts. + 6 = £7 10s. = 30s. per ton of excreta added, *i. e.*, my original estimate of its value. Of course this can be fortified by re-use, or by adding the ammonia obtained in the distillation, to almost any extent. In fact, one of the analyses quoted in my former paper shows a charcoal retaining nitrogen equal to 105 per cent. of sulphate of ammonia. But in addition to its actual manurial value, by re-burning at any rate that portion of the product which is required to replenish the closets and keep up the supply for the city, I obtain some new products of value, which have never yet entered into the calculation. These are acetate of lime, tar and gas. The former arises from the acetic acid which

* I quote from his paper read before the Society of Arts, February 23d, 1870.

* Parkes calculates the solid excreta of vegetarians at more than double this, or nearly 12 ozs. per day.

†Common salt itself an efficient disinfectant, always exists in X charcoal but in variable quantity.

comes over from the destructive distillation of the vegetable residues ejected in excreta; the two latter mainly from the fat passed in the excreta. I have before shown that we are only employers of fat as we are employers of nitrogen and phosphates, and though a portion is consumed, especially in winter, in supplying fuel to our bodies, yet a large portion is found in he excreta. This appears as tar in the distillation. This little item in Glasgow would amount to seven tons a day. The acetate of lime is as valuable as the sulphate of ammonia.

I need not here go further into the chemistry of the process, as that has been fully investigated, so far as known products are concerned, and an exhaustive series of analyses of the results has been published in my former papers submitted to the Chemical Section of the British Association, and published in full in the *Chemical News*. The analyses speak for themselves, and the statements have never been refuted.

Now, with regard to the healthfulness of the dry process of removal, I can find no evidence of any kind which in the least tells against it. The germ theory of disease, now so generally believed in, is all in favor of a system which localizes the poison and prevents its spreading. In opposition to water, which certainly spreads the germs, of that there is unlimited proof; the ordeal by fire to which I subject them must be absolutely destructive. No one knows exactly what the germs of cholera, scarlet fever, etc., are, but all admit them to be organic, and therefore all must admit that subjection to a red heat in an iron retort must destroy their vitality. On last month, at a meeting of the London Association of Medical Officers of Health, Dr. DRUITT, in his opening address, alluded to the prevalence of scarlet fever in London. "He believed scarlet fever to be emphatically a product of sewer gases." Dr. ROGERS thought "scarlet fever to be more under control than any of the preventable diseases. The reason of its spreading so rapidly in some districts was that the excreta were not properly got rid of."

Dr. TILLEY said that he had recently inspected forty or fifty houses into which there was a constant admission of sewer gases. (All this in London, where £5,000,000 have been spent on sewage with all the latest improvements, and gigantic pumps for lifting the sewage and leaving the gases behind.) Dr. DRUITT said that sewers require disinfecting by drenching with carbolic acid in large quantity. Now, if it must be disinfected, how easy to add the disinfectant at the source. I claim, then, the most extended benefit to health of towns by the adoption of this process.

As I propose, however, that the vault of a private house should only be emptied once a year, and as some may fear injury to health by allowing a ton or two of the X mixture to accumulate, I append an extract of a letter from W. GILBERT HICKEY, Esq., C. E., of Calcutta. July 9, 1870, which should allay all fear on this head, and will show the extraordinary power of X charcoal. He says: "I put this to a very critical test. I placed an iron cylinder in my office; I perforated the bottom and placed a thin layer of charcoal poudrette, or poudrette coke, *i. e.*, the residue left in the retort after carbonizing excreta. I then sent to the public latrine and had one cwt. of human ordure poured in. On top I placed a layer of poudrette coke about two inches thick. It remained in the room for six weeks, and there was no nuisance of any kind."

Now, if one cwt. of human ordure can be kept in an office in Calcutta so long as this, completely deodorized by a slight layer of X charcoal, you may believe that nothing can be more inoffensive than a mixture of equal parts of each, such as I propose.

Now, as to the application to houses of the dry system, I deny that it requires any more supervision than the water-closet system. One great advantage the householder has by using this process is, that if there should be any odor in his closet, he has the remedy in his own hands. One of his servants has, perhaps, emptied some chamber slops into the urinal, without lifting the handle of the closet and allowing a charge of charcoal to fall. He has only to do this, and the closet is at once deodorized. Now, with the water-closet, as the odor is due to sewer gas, the common method of letting down quantities of water only aggravates the evil, for the opening of the valve allows more gas to escape into the closet. For invalids the dry system is invaluable, and in fact, absolutely necessary. I would request any who are not convinced of its value, or foresee any difficulty in applying it to towns, to read an American work on "Earth Sewage," by G. E. WARING, or inspect our arrangements at Dalmuir.

I understand that the householder is to have the use of the deodorizer for nothing, and the house to be visited by the "golden dustman," as I may call him, but once a year. The quantity of charcoal required is equal to that of the excreta removed. The method could be easily adapted to improve the removal of the town manure, with great advantage to health. The loss of Glasgow working men and women from ill-health and sickness must be enormous, and the consequent loss of work of each person must be felt by the whole city in one form or other. Our town authorities are now, I believe, really awake to the alarming reports of the *Daily Mail* commissioner. I would quote, however, the best paragraph in Professor CORFIELD'S report, and address them in the words of Mr. ROWE: "The man who, in a crowded street, is living in filth and breathing a putrid atmosphere, or who makes that street a receptacle for the offal which he casts from his dwelling, becomes an instrument of danger to his neighbor by spreading infection, and he not only hazards his own life but endangers that of others. The man who erects a flimsy edifice in a crowded thoroughfare, which in its falling may destroy life, should be prevented doing so, and he who constructs a house to let for profit, and pays no attention to those matters which are essential to comfort, but, on the contrary, so constructs it as to engender fever and endanger the lives of his tenants, all these are cases where, with propriety and in justice, the legislature ought to interfere, and to insist upon such a mode of construction as will not endanger human life."—*Chemical News.*

The Gatling Gun.

THE following abstract from a notice of this American invention from our English contemporary *Engineering* will, we think, be found of interest;

"During the past five months a considerable amount of attention has been given by the War Office authorities to weapons of the mitrailleur class, several series of exhaustive experiments having been carried out at Shoeburyness in order to ascertain their capabilities. These experiments were comparative, and in the commencement were confined to the Fosberry mitrailleur, which is the Montigny weapon improved by Major FOSBERRY, a muzzle-loading 9-pounder, and a breech-loading 12-pounder field gun. This was in the beginning of August last; at the end of that month the comparison was extended to the Snider and the Martini-Henry rifles. At this date another candidate for the honor of committing the greatest amount of slaughter in the shortest time, put in an appearance at Shoeburyness and at once entered the lists. This was the Gatling battery gun, the invention of Dr. RICHARD J. GATLING, of Indianapolis, U. S. It was fired in competition with the mitrailleur, the field guns, and the rifles, and although last on the list of entries, it stands first on the list of results. The details of all the experiments which were publicly made have already been given by us. There were, however, other experiments carried out by the committee appointed for that purpose, and of which Colonel WRAY, C. B., R. E., is the president. The whole series of trials form the subject of an elaborate report which has been made by the committee to the War Office, and which document is at present under the consideration of the Secretary of State for War, the Commander-in-Chief, and the Lords of the Admiralty.

"Pending the publication of this report nothing is absolutely known as to which weapon the committee recommend for adoption in the service. We have, however, every reason to believe that the Gatling gun has been recommended, inasmuch as twelve of these guns have been ordered to be made and issued to the troops for trial, in order to confirm the experiments which have already been carried out at Shoeburyness. These guns are now being made at the Elswick Works; Sir WILLIAM ARMSTRONG & Co. being the manufacturers for, and the present representatives of, the Gatling Gun Company, in England. That Colonel WRAY'S committee should recommend this gun in preference to the mitrailleur would only be a natural consequence of the results of the experiments made by them, and of the general superiority of the Gatling weapon. The ultimate results of the practice made under the committee and detailed in their report, are within our knowledge, and we therefore append a summary of them. The expenditure of ammunition and the number of hits made by the four heavier weapons are as follows: The Gatling gun firing 492 lb. of ammunition scored 2,803 hits; the Fosberry mitrailleur, with 472 lb. scored 1,708 hits; the 12-pounder gun with 1,232.5 lb. scored 2,286 hits; and the 9-pounder gun with 1,013 lb. scored 2,207 hits. A comparison of the effects produced and the ammunition expended by each weapon as shown by the above figures unquestionably gives the superiority to the Gatling gun, and upon these grounds we may fairly assume that the committee have recommended this weapon. But there are many other considerations of equal and perhaps greater importance than the results of target practice, which have to be taken into account, and it would be unwise to assume that the Gatling gun has been recommended solely because it has made the greatest number of hits. From our knowledge, however, of this weapon, and of its ability to stand the rough and ready tests incident to actual warfare—which it did stand during the American war—and from a comparison of the construction of the two machine guns, we may reasonably expect the Gatling gun to occupy that position which at the first it appeared probable the mitrailleur would take.

"The Gatling battery gun is no new weapon, its construction having been well known—and its name still better—in this country for some years past. It is indeed perfectly clear that the Gatling gun is the parent of the French and other mitrailleurs. At any rate, its date is antecedent to them, and, in our opinion, it was the first gun of its kind, and the prototype of all that have succeeded it, for the following reasons: The first Gatling gun was made in 1862, and was publicly exhibited in Indianopolis, Cincinnati and Washington, general descriptions of it being published in the American and European papers. In the following year Dr, GATLING sent a letter of particulars to the French Government, through Major MALDON, of the French Artillery Committee. The Emperor desired the major to obtain further details, which Dr. GATLING supplied, at the same time offering his guns for sale, which offer, however, was declined. Subsequent to this we had the mitrailleur making its appearance in France, in Belgium, in Prussia, and in Austria. As the mitrailleur is upon the same principle as the Gatling gun, in so far as that it consists of a number of barrels grouped together and an equal number of locks, circumstances point strongly to the Gatling gun as the original weapon. * * * * * * * *

"It will be seen that the Gatling gun is a very perfect piece of mechanism, and that there is nothing about it that is mysterious. If, by bad management, any clogging should take place in the feeding of the hopper in guns to which the drum feed is not fitted, it is thrown back and the matter righted in a few seconds. If also one of the locks should become inoperative, it can be taken out through the opening in the cascable plate and a new one inserted in a very short time. The main parts are sufficiently strong to withstand injury in use, and duplicate pieces of the smaller portions form part of the outfit, in which is also included a supply of powder and bullets for reloading the cartridge shells. In short, the gun is the most perfect weapon of its class at present extant, and we have only one suggestion to offer, and that is, that a low vertical steel screen be fixed across the piece, for the protection of the man serving it, and who is seated on the trail of the gun. With the drum feed and the traversing motion, the Gatling gun is a formidable weapon for certain purposes of warfare, and with the screen—which should have an aperture for sighting—it would be practically safe to the gunners. We should not omit to add that to Captain BENTON H. ZERBE, who has charge of the practical working of the Gatling gun in England, we are indebted for information respecting the improvements in its details."

Narrow Gauge Railways.

TO THE EDITOR:

SIR—The subject of railway gauge is once more attracting the attention of the engineering world. It is twenty-five years since the first "battle of the gauges" was fought between the 7 ft. and 4 ft. 8½ in. gauge, with the well-known result of neither gaining a victory at the time, and of both carrying out their ideas into practical operation. Looking back to that period, it is interesting to read over the conflict once more, and note what the advocates of each had to say of their respective gauges. They were then without any previous experience or knowledge to guide them in deciding a matter of so much importance, and it was, therefore, difficult for them to arrive at a right conclusion. The broad gauge appeared to many the most advisable from the large capacity and steady running of the rolling stock. They did not take into consideration that, though it was well enough for the public, others had an interest and heavy stake in the matter, viz., the shareholders, and that if the latter were not successful the public would also be a loser in the long run. The advocates of the 7 ft. gauge claimed the following advantages by its adoption:

1. Attainment of a high rate of speed. 2. Increased facilities for the use of larger and more powerful locomotives. 3. Admitting low centres of gravity for rolling stock, and giving increased stability and steadiness of motion.

The objections were: 1. The increased cost of construction. 2. Greater weight of rolling stock, and liability of axles breaking from their great length. 3. Greater friction in passing round curves.

As regards the first, it was argued that there was only an excess of 7 per cent. in earthworks and land over the 4 ft. 8½ in., and that the carriages were lighter in proportion to load carried, that in practice axles did not break, and that, as regards friction, it did not hold true with the broad curves set out on the Great Western. It will be noticed that the arguments used at present by the opponents of the narrow gauge are much the same as those formerly used in favor of the 7 ft. gauge and against the 4 ft. 8½ in. gauge. The result eventually was that, though there was some truth in the advantages claimed for the broad gauge, still the objections were much more cogent, and no more lines of that description were constructed. For many years railway promoters were content with constructing lines on the standard gauge of 4 ft. 8½ in. without ever considering whether greater advantages could not be gained by adopting a smaller gauge. Though the high hopes entertained of the great benefits of cheap and quick communication have been fully realized, and the increase in traffic beyond anything anticipated, the return on capital outlay to shareholders is adequate, which has had the effect of stopping investments in railways to a great extent. There are, however, many districts in this country, and large tracts in the colonies, which require railway communication to develop their resources, but there is no prospect that many lines on the existing system will be made, as no return can be expected on the outlay. It appears, therefore, that railways of the future should possess the following capabilities: 1. Moderate cost of construction. 2. Moderate cost of maintenance and working. 3. To have the necessary stability, and to run at speeds required for public despatch, with safety and comfort to the passengers. 4. Capacity to carry all the traffic required, and available for any increase in the traffic that may eventually take place. 5. Capacity to carry troops, ordnance and military stores, and be available for all purposes during time of war.

As the first and second requirements are governed to a great extent by the gauge, and it has been proved that changes from 7 ft. to 4 ft. 8½ in. are needlessly wide, it is evident that railways on a narrow gauge must be constructed. The question, therefore, is what is the gauge that will nearest fulfil the above requirements? This is naturally a subject of controversy, but it is to be hoped that only one narrow gauge will be decided upon for the same country. From the experience gained with extreme wide and narrow, as well as intermediate gauges, engineers are at present in a much better position to determine the best gauge for the future than was the case when the first had to be decided upon.

In the paper I read before the Inventors' Institute, in 1865, on Narrow Gauge Railways, I advocated a 2 ft. 6 in. or 2 ft. 9 in. gauge for future lines. Since then, I have gone fully into the matter, and taking into consideration that it would be advisable to be able to construct locomotives with inside cylinders, and that in hot countries more space is required for passengers than in temperate climates, and having gone carefully into the dimensions and capacity of rolling stock and the nature of the traffic, I have come to the conclusion that the 2 ft. 9 in. gauge is the most advisable for India, and will fully meet all requirements. From my experience in working the 1 ft. 11½ in. gauge, I deduce the following to show the sufficiency of a 2 ft. 9 in. gauge: 1. That the cost in first construction in earthworks, bridges, tunnels, etc., depends on the gauge. In regard to the construction there is another matter for consideration with Indian lines which is of great importance—that is, being able to lay down a double line of the 2 ft. 9 in. gauge on

a single line formation of the 5 ft. 6 in. gauge when required without altering bridges, viaducts, tunnels (as on all the Government lines these are made for a double line), or earthworks, without any extra expense, except laying down the permanent way. 2. That the cost of maintenence of rolling stock and way will be low, consequent of the small weight on each wheel, and less damage to rolling stock in shunting or on collision occurring. 3. That a speed of forty miles an hour can be run with ease and safety, as a speed of thirty-five miles an hour has been attained on the Festiniog Railway. The present working speed is sixteen miles an hour, which I understand is about the standard speed for the proposed Indian lines on 5 ft. 6 in. gauge. Objections have been made to the accompanying plans of horse boxes and cattle trucks on four wheels as not having the required stability and danger of their being blown over by the wind. The formula, however, by which this conclusion is arrived at does not bear a practical test, as will be seen on comparing it with a Festiniog railway carriage. This has a side area of fifty-three feet; the centre of wind pressure is at four feet above rail; the weight, when empty, one and a quarter tons. The pressure of wind that it would balance, according to formula, would be $\frac{1.25 \times 2240 \times .96}{53 \times 4} = 12.6$ lb. per square foot. They have, however, stood the severest storm known in this country, without being blown off the rails at a time when large trees were rooted up.* The amount of pressure necessary to blow a carriage over will also depend on the position of the centre of gravity. It is therefore evident that if these carriages, with an angle of stability at 31° 31′, are quite safe, there can be no fear in regard to the stability of rolling stock on the 2 ft. 9 in. gauge, with an angle of 41° 30′. 4. As to the capacity of a 2 ft. 9 in. gauge to carry the required traffic. The Festiniog railway proves that a very heavy traffic can be conducted; the capabilities of a 2 ft. 9 in. gauge in this respect are therefore evident.

To gain adhesion for the secured tractive power to transmit heavy trains at necessary speeds, and rolling stock of the required capacity, the most feasible known plan should be applied, viz., engines on the bogie principle, with four-wheel double-bogie frames, or six-wheel double-bogie frames, according to the gradients of the line or traffic; and, if need be, with lines of very exceptional gradients and heavy traffic, large quadruple bogie engines, by which means the weight of engines is distributed evenly, and rolling stock dispersed over the line of way, flange and drag friction reduced to a minimum, saving in wear and tear of permanent way, great advantages gained in traversing curves, all of which means money saved in maintenance of way and rolling stock, besides of fuel consumed for a given load. The rolling stock can by this means be made to carry proportionately much more than the usual rolling stock on lines of the ordinary gauge. For instance, the bogie horse-box weighs seven tons, to carry six horses, with two compartments for grooms and fodder, having, when loaded, one ton six cwt. on each wheel, whereas an ordinary horse-box on the 4 ft. 8½ in. gauge weighs six tons, and carries three horses with one compartment for groom, and having, when loaded, one ton seventeen and a half cwt. on each wheel. The bogie cattle truck weighs five tons fifteen cwt. to carry ten beasts, weighing, when loaded, eleven tons fifteen cwt., or one ton nine cwt. to a wheel. An ordinary cattle truck on the 4 ft. 8½ in. gauge, carrying ten beasts, weighs five tons ten cwt., and, when loaded, eleven tons ten cwt., or two tons seventeen cwt. to each wheel. Surely these trucks, with low centre of gravity and steadiness secured with easy running on the rails, must have far greater stability and comfort to the beasts than those in use on the ordinary lines. Bogie trucks can be made for the 2 ft. 9 in. gauge of various dimensions and convenient sizes, for carriage of cotton, grain, and coffee, to hold from thirty to forty bales of pressed cotton of four to five tons, and of grain from ten to fifteen tons; in fact, the bogie principle for this gauge affords a wide margin for construction of carriages and vehicles of any description and convenience. The accompanying plans of bogie passenger carriages are for first-class, with van to carry thirty passengers, having seat room of 22½ inches for each person, and third-class carriage, with van to carry fifty-six passengers, with seat room of 17 inches for each person. The four-wheel passenger carriage to carry twelve first-class or sixteen third-class passengers.

I advocate the bogie principle because I believe it to be practically the correct one, and which as a rule should form the majority of the rolling stock on narrow gauge lines, not but that bogie engines of one pair of cylinders for express passenger trains, and small four wheel engines for shutting purposes should be applied, also small four wheel trucks to any required extent in combination for light loads of minerals and goods. In the plan of bogie horse-boxes all sagging is obviated by a sufficiently strong framing; nor is there any difficulty of arranging in the detail plans for the girder framing to resist the compressive and bending strains from the action of the buffers. On the Festiniog Railway trains of the four wheel slate wagons are daily pushed or propelled over the Waethmawr embankment, comprising 40 to 120 wagons, without any sagging occurring. Horse-boxes to carry many horses as well as few must have their advantages for horse dealers and for military purposes. To obviate the possibility of a four wheel horse-box being overturned by wind pressure with single horse on the lee side of truck, there is no difficulty whatever in arranging the centre division of the stalls movable on rollers, and an auxiliary movable partition on one side, which can be used as necessity requires either for one or two horses. In respect to objections made to cattle trucks, it will appear impossible for the cattle to make escapades through the side openings, even though the cant rail was made two or three inches higher, as their heads in rising would come in contact with the top rail or roof. Nor would there be any difficulty in putting the cattle into the truck from the low height of side, as the head would be well in before treading the floor level.

As regards the dimensions of the rolling stock on a line of railway, it is argued that the width ought to be double the gauge. This certainly approaches near to the width of what it should be. On the 1 ft. 11½ in. the width of carriage having floor level above the top of wheels is 2½ times, and on the 4 ft. 8½ in. it is 1½ times the gauge. The Festiniog Railway carriages and trucks run very steady, at a speed of twenty miles an hour, and proved to have the lateral stability even when going over the old rails of 30 lb. to the yard unfished, when the joints were depressed on one side in many cases one-half inch. There is no doubt that the rolling stock at present on the ordinary lines does not give nearly the proper carrying capacity compatible with the gauge. This cannot, however, be increased, as the weight already brought upon each wheel is too great, and the rails soon become disintegrated and crushed, lasting only four or five years under moderate traffic, and in cases of heavy traffic at or near stations, only as many months. Steel rails, for durability, have great advantage, but at a heavier cost, though even these barely sustain the great weight and impact forces of the engines and rolling stock at high speeds, besides steel against steel has the effect of sooner wearing out the tires. I believe that the maximum weight on each wheel should not exceed three tons.

The trucks on ordinary lines having scarcely any overhang outside the framing, there is no counter-pressure against a collapsing tendency along the centre line of floor, but which would be the case when having a proper overhang. A coal truck on the Festiniog Railway is of the following proportions to the gauge: Length, 4½ times; wheel base, nearly 3 times; width, 2½ times; and the depth, nearly 1½ times the gauge, carrying 3 tons of coal at a working speed of 16 miles an hour, the line having maximum curves of 1½ chains radius.

From experience gained in working this rolling stock, I consider the following to be the proportions which should be applicable for the different gauges. The width of trucks to be 2½ times the gauge, the depth 1½ times, the length 4½ times, and the wheel base 2½ times the gauge, outside dimesions.

TABLE OF PROPORTIONS OF ROLLING STOCK FOR DIFFERENT GAUGES.

	Gauge.	Wheel base of truck.	Length.	Width.	Depth.	Height of floor above rails.	Tare weight.	Load of coals 43 cubic feet to a ton.	Gross weight.	Weight to each wheel.	Angle of stability.	Usual load of truck at present in use.
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	tns. cwt.	tns. cwt.	tns. cwt.	tns. cwt.		cwt.
Festiniog Railway	1 11½	5 8	9 6	4 10	3 5	1 10	0 19	3 0	3 19	0 19½	per cent.	
Revised proportions..	1 11½	4 10	8 10	4 5	3 2	1 7	0 13	2 0	2 13	0 13	39	
	2 6	6 3	11 3	5 7	4 1	2 4	1 0	4 0	5 0	1 5		
	3 9	6 10	12 4	6 2	4 11	2 11	1 10	4 10	6 0	1 10		
	4 6	8 8	15 9	7 10	5 7	3 4	2 0	5 0	7 0	2 0		
	5 3	9 9	18 3	8 7	6 2	3 10	2 10	6 0	8 10	2 10		
	6 0	11 0	21 0	9 5	6 11	4 4	3 0	7 0	10 0	3 0		
	6 8½	11 9	24 9	10 13	7 8	4 9	3 10	8 0	11 10	3 10		
											42½	
Usual load of truck at present in use.												tons. cwt.
												from 8 to 10 tons.
												3 0
												from 10 to 12 tons.
												4 0

From the above table it will be seen that the 3 ft. 6 in., 4 ft. 8½ in., and 5 ft. 6 in. gauges are totally inapplicable, as there would be too great a weight on each wheel. It is argued that rolling stock with the same length of wheel base will traverse curves as easy on one gauge as another; this is true so far as flange friction is concerned, but the drag friction is increased exactly in proportion to the width of gauge, or twice the friction on a 5 ft. 6 in. as on a 2 ft. 9 in. gauge.

5. In regard to the capacity of a 2 ft. 9 in. gauge for military purposes, it will be seen from the accompanying plan that heavy ordnance—say two 12-ton guns—can be carried with the greatest ease. The calculated weight is 5 tons 15 cwt., giving, when loaded, 2½ tons on a wheel. Trucks of this description would be available for carrying railway bars, bridge girders, etc. Field guns and other war material can be conveyed in the general goods trucks.

Apologising for the length of this letter,

I am, Sir, yours faithfully,

C. E. SPOONER.

PORTMADOC, Dec. 12, 1870.

—*Engineering.*

* This is no proof of an error in the formula; but simply a proof that —supposing Mr. SPOONER's weights and dimensions to be correct—the Festiniog carriages have not been exposed to a wind pressure exceeding 12.6 lb. per square foot. If they had been, over they would have gone to a certainty. The formula is no empirical one, but is founded on simple and well-known laws.—ED.

MINING SUMMARY.

Nevada.

"MINERAL HILL"—ITS MINING INTERESTS AND PROSPECTS.

A correspondent of a centemporary writes from Mineral Hill, Nev., Dec. 19: "Nevada and its mining interest has been quite well written up to the readers of the *Herald;* but there are many points and places worthy of attention—her thriving condition in manufacturing, stock-raising, and agriculture. The new discoveries of rich mining districts cannot fail to be of interest to those acquainted with the resources of this State. It is of the latter I wish to speak, and without any more beating around the bush I will proceed with a very matter-of-fact letter. First let us glance at the mining interests of this part of the State, which is becoming of such vast importance to Nevada, on account of its being on the line of railroad to Omaha on the Pacific coast. Mineral Hill is about forty miles from Carlin, a prominent station on the Central Pacific road. The Hill was discovered about two years ago, and to-day we have 500 souls of all kinds located here. At the State election we polled 160 votes, of which 101 were of the Andrew Jackson stripe. Your humble servant was one of the clerks. Among the most promising and leading mining claims are the following: Keystone, Argentum, Monroe, Norman, Grant, Grey Eagle, Wissahickon and Austin. Many of these claims are owned by parties in Omaha, among whom I have learned the names of Mr. ROBINSON; Mr. PIER, of the firm of PIER, RICHARDS & Co.; Mr. LOGAN and Mr. CEOOGE GRATTON; the latter, I believe, is the City Gas Inspector of Omaha, to whom some of the best and richest specimens were sent to-day ever taken out of any mines, whether of Utah or Colorado. To those interested in minerals of this kind, I advise them to call upon Mr. GRATTON and inspect the same."

OMAHA SMELTING STOCK.

"There is now a very fine twelve-stamp mill running, in which is crushed twenty tons of ore in twenty-four hours. After it is crushed it is ready for the smelting and refining works; and as it is expensive and slow work to send this crushed ore to Jersey or Wales, we therefore advise your Omaha works to hurry up, and Nevada alone will give them all they can attend to. There are now many racks already filled, awaiting the glad tidings of 'We are now ready for work,' from the smelting works of Omaha.

"In my next I will endeavor to give you some facts and figures in relation to the cost of these mines, amount paid for labor, the assay of the various metals taken from each claim, and the general prospects of this truly rich hill."

MILL FOR PIERMONT.

The following items are from the Reese River *Reveille*, Dec. 16: "A ten-stamp mill is about being erected by Mr. TREGLOAN, to work the ores of the Piermont mine. We believe this mine is principally owned by JERRY CAUGHLIN and RICHARD GODFREY, formerly of Austin."

BULLION FOR THE EAST.

WELLS, FARGO & Co. completed a shipment last evening of seventeen bars of bullion, consigned to LEES WALLER, New York, from the Manhattan Company, weighing 1,516 pounds, and valued at $20,017.

SMELTING WORKS ATTACHED.

The Elko *Independent*, Dec. 10, says: "The smelting works of the Palisade Smelting Company, at Railroad district, are under attachment for debt. If half the reports about the mismanagement of the affairs of the furnace which have come to our ears ever since that 'iron tub' called a copper-smelter was put up last spring, are true, it would have been a blessing to the district if the attachment had been served months ago. These remarks are severe, but just and true. Time after time we have inserted the representation of parties from that district, and parties who had no intention to falsify, about the movements of that company, giving them character by announcing the efficient progress of the work, and we find, after months of experimenting at the expense of the labor of the hard-working miners, they have suspended under the influence of a judicial writ. The district is one having merit, but the assumption, presumption and imposition of small-sized dealers in ore and experimenters in furnaces, have well nigh settled it for the present season. Another year, we trust, this district as well as others will receive the aid of more practical, intelligent and financially competent adventurers."

REVIEW OF THE COMSTOCK MINES.

We take from the Gold Hill *News*, Dec. 10, the following items of information relative to the mines of Gold Hill, especially those along the Comstock:

CROWN POINT.

Daily yield forty tons fair grade ore from the old upper workings of the west ledge. Considerable excitement has been created, during the last few days, relative to a reported strike of good pay ore in the south drift, from the 1,100-foot level, inducing a decided stir in the stock, raising it from $2 75 to $19 50 per share. This ore development is some 300 feet from the Kentuck line, or about half way from the Kentuck to the Belcher mine, next to the west clay wall of the ledge. The face and east side of the drift, for fifty or sixty feet, shows spots and streaks of ore, with some base metal but as yet no well defined body. What ore there is is all low grade, which will perhaps mill $6 to $10 per ton. A cross-cut 18 feet in length has been made east through it from the main drift. Although this new development is not rich, yet it is a very encouraging one, and there is good reason to hope that it may eventually lead to something good in that line farther south, perhaps extending into the Belcher mine, or, it may be, the outskirts of a good body of ore to be found below that level. Some of the experts, and those who should be capable of judging, have come to the conclusion that it is simply the "making" or lower skirtings of the ore body worked at the 600 feet level, which broke off between that and the 700 feet level, and the continuation of which was never afterward found. The fact that no drifts were ever run so far south below the 700 foot level, favors the aforesaid opinion, which, if found correct, is of much importance to the mine. The new ore deposit is found to be about twelve feet wide in all, and at the extreme south end it appears to be the most concentrated. A cross-

cut at that point will shortly determine further the value of the strike. The incline is now 157 feet below the 110 foot level, and the bottom is in hard quartz and porphyry. A new station will be opened within the next few days. The present assessment of $3 50 per share became delinquent December 1st, and December 20th is the day of sale. November receipts, $26,673.04.

SAVAGE.

Daily yield increased to 130 tons, assays averaging about $30 per ton. The greater part of this yield is from the eighth level, the old upper mine contributing but a few tons daily. Under the efficient direction of the new superintendent, JAMES G. FAIR, who is also superintendent of the Hale & Norcross, this mine is having its actual merits energetically and practically developed. At the ninth or lowest level, all the prospecting drifts are actively driven ahead, with excellent progress. Cross-cutting from the south drift has already intersected the ore body worked in the level above. The east drift is now in over 190 feet east from the shaft, and no traces of metal are to be met with in the quartz. The north drift is in 180 feet from the shaft, and the face is in barren quartz, with streaks of porphyry. The main shaft is now down 77 feet below the ninth station, and a new level will be opened in January. The present rise in the stock of this mine is attributable more to the change in the management than to any new developments in the mine itself. The south drift at the ninth or lowest level is in over 250 feet from the shaft, and within 50 feet of connecting with the drift being run north from the seventh level of the Hale & Norcross mine, which is already 90 feet beyond the Savage line. This will be a valuable connection for air, and through it also the ore from that level can be extracted much cheaper and with greater facility than by the present mode of extraction. Indeed, 27 tons of the daily ore product of the Savage mine is being now hoisted through the Hale & Norcross shaft to excellent and saving advantage, as the main body of the Savage ore is being found next to the Hale & Norcross line. A great deal of extra work is at present being done, repairing the shaft and putting the various drifts in proper order for good, practical, advantageous working. In the old upper mine, also, certain drifts are being run, for purposes best known to the superintendent.

HALE & NORCROSS.

Daily yield, 165 tons, principally from between the sixth and seventh levels. The heaviest body of ore is south of the shaft, although the ore-breasts north still yield splendidly, with good promise of holding out for some time to come. At the eighth, or lowest level, recently opened, the ore-vein has not been cut into, but exclusive attention has been paid to drifting northward in the west wall. This drift is now in about 80 feet from the main east drift. Rather slow progress is made, owing to the very hard nature of the rock. No connection is yet made with the winzes sunk from the level above, neither is the water drained from them by this lower drift. A cross-cut, to connect with the first winze, 60 feet north of the east drift, was commenced a day or two since, which has already cut into the ore-vein eight feet, all the way in very excellent ore. The connection with the winze will be made during the coming week. There is, no doubt, as good a body of ore as in the level above—perhaps better. The object at present, however, is to run the main working drift north before cross-cutting much, or trying to breast out ore. When the drift reaches opposite the other winze, 150 feet north of the shaft, a cross-cut will also be made to it. This north drift is in 80 feet from from the main station gangway, or east drift, which is n just 97 feet from the shaft, and within 12 feet of the pay-streak. The old upper mine gives about 35 tons per day contribution to the regular daily yield of the mine. At the seventh level, a drift north, now 93 feet beyond the Savage line, is being run to connect with the south drift from the ninth level of that mine, for the benefit of the Savage Company, in the cheaper and more advantageous extraction of their ore, besides giving a fine circulation of air to both mines in that quarter. The regular monthly dividend of $5 per share, aggregating $40,000, was declared last Monday, payable to-day.

CHOLLAR-POTOSSI.

Daily yield about 300 tons, assays averaging nearly $70. During the past ten days the ore yield has been of a superior quality, and all the ore sections, stopes, breasts and sections are looking exceedingly well; indeed, the mine never looked as promising or yielded as well as now. The Belvidere section contains an immense body of the very best ore yet to be worked, and the old Blue Wing will yield handsomely for a long time. The drift west from B street, just south of the old Potosi mining works, has developed a good-sized body of ore beneath where the office of the company formerly stood. The drift west from the new shaft is in over 500 feet, and is evidently just cutting into a rich body of ore, seventy-five feet east, and 125 feet below the present workings. The November receipts from the mine fitted up to the handsome sum of $258,296 89. A dividend of $5 per share is declared, payable to-day, aggregating $140,000. Up to and including July, the dividends of this company were at the rate of $1 per share. In August, the monthly disbursement to stockholders was increased to $2; in September to $2 50; in October to $3; in November to $4; and this month to $5 per share. In July the stock sold from $30 to $36 per share, while last month the range was from $70 to $80 per share. After disbursing the dividend for this month, the company will carry the handsome surplus of over half a million dollars.

KENTUCK.

This mine is still closed, and will not be reopened for working until the first of next March. At the recent meeting of the company an entirely new Board of Trustees was chosen, viz.: M. J. MCDONALD, O. H. BOGARD, H. F. CUTTER, W. F. KING and L. VESABIA. According to the report, the mine produced, during the year ending October 30th, 18,103 tons of ore, yielding $371 198, or an average of $20 50 per ton. Dividends have been paid to the amount of $70,000, viz.: $20,000 each in November, December and January, and $10,000 in February. In August an assessment of $10,000 was levied. From the annual report we extract the following exhibit:

RECEIPTS.

From bullion	$371,198 24
Assessment No. 3	10,000 00
Lumber contract—paid last year	11,250 90
Other items	485 88
Total receipts	382,934 12
Cash on hand, November 1, 1869	79,880 54
Total	$472,814 66

DISBURSEMENTS.

Dividends to stockholders	$ 70,000 00
Crushing ores	220,970 48
Labor	102,127 50
Timber	21,179 97
Hoisting ore	8,594 70
Oil, candles and other mine supplies	7,115 57
Mine and office expenses	12,238 53
Gold Hill expenses	5,968 98
Branch railroad to Kentuck dump	5,135 79
Assaying	4,026 23
Miscellaneous items	9,312 11
Total disbursements	466,669 86
Cash on hand, November 1, 1870	6,144 80
Total	$472,669 66

BELCHER.

THOMAS W. BOWEN, the newly-appointed Superintendent, entered upon the discharge of his duties on the first of this month. The usual amount of prospecting is being carried forward energetically from the 420-foot level-up, nothing being done below that point. The principal development, however, is in a winze, or incline, sunk from the 335-foot level, fifty feet from the south line, following a small, but very promising ore-seam, about three feet wide, which yields at present from three to five tons daily, of rather good grade ore. It looks very well, and bids fair to extend to the level below. The winze is now thirty-eight feet in depth, and the ore-seam is found lying comparatively flat. Another very promising ore-seam, assaying rather better, is found in a raise above the 420-foot level. It is three feet wide. A cross-cut, west from this raise, has been started. Belcher stock, like that of the Crown Point, has experienced quite an elevation during the past few days, raising from $2 50 to $3 50 per share, owing principally to the new-ore development at the 1100-foot level of the Crown Point. An assessment of $1 per share was levied on the 2d instant, delinquent January 5th.

GOULD AND CURRY.

Daily yield eighty tons, all from the old upper mine; average assays $50 per ton. The ore sections hold out well and show little or no change for either better or worse except that the Potosi body shows some little improvement in both quantity and quality. Nothing doing at the lowest levels, all attention and resources being concentrated upon vigorous prospecting and development in the upper mine. The annual meeting of stockholders took place on Monday, Dec. 26th, and from the statements rendered we take the following:

RECEIPTS.

Reduction of ores at custom mill—23,499 tons	$661,013
Premium, ore slimes sold, etc.	8,568
Assessments, No. 7 and 8	132,000
Railroad freights returned	5,068
Materials sold, etc.	12,443
Total	$819,092

DISBURSEMENTS.

Indebtedness, Nov. 30, 1869	$29,934
Dividends	48,000
Reducing 25,194 tons of ore	302,063
Labor at mine	229,399
Timber, lumber, and wood	93,153
Iron, hardware, charcoal, candles, etc.	46,823
Taxes, exchange, and interest	11,775
General expenses	22,211
Sundry accounts	8,882
Cash on hand, Nov. 30, 1870	26,852
Total	$819,092

The assets are given at $203,614, and liabilities only $2,629. The ore taken from the mine for the fiscal year amounted to 24,305 tons, averaging $28 16 per ton. The President's report has the following statement:

	Ore, tons.	*Yield.*	*Mining.*	*Milling.*
1870	24,305	$28 16	$6 82	$12 85
1869	15,879	26 30	7 29	13 08
1868	12,153	18 14	3 73	12 62

BULLION.

Nothing doing in the mine at present; therefore the hoisting works are idle. A new shaft, however, is soon to be sunk near the north line, from the surface to the 135-foot level of the mine, in search of good ore supposed to exist at that point, probably extending from the Chollar-Potosi. An assessment of $3 per share was levied yesterday.

IMPERIAL-EMPIRE.

About sixty tons daily is the yield from the upper mine, giving an average assay of $23 per ton. The east drift at the 1,300-foot level is now in 173 feet from the shaft, the face showing good promising quartz, with traces of metal. The west drift at the same level is in 140 feet, showing porphyry with seams of quartz. Sooner or later, the same or similar bodies of ore to those found at the lower levels of the Yellow Jacket should be found in this mine, the ledge bearing a similar appearance at the same depth. The present imperial assessment of $10 per share becomes delinquent Dec. 27th.

YELLOW JACKET.

The south hoisting-works were shut down last Monday in order to put in new machinery. It will take about the 10th of next month before the works will be ready to start up again. Nothing is consequently being done in the way of ore extraction at present, but the two lower drifts, at the 1,000 and 1,100-foot levels, are being still pushed further north under contract, working through the Crown Point mine. George W. Hopkins has been appointed Secretary of the company, in place of F. F. Osbiston, resigned, and entered upon his duties as such yesterday.

CALEDONIA.

Daily yield, fifty tons good grade ore, principally from the 300-foot level. The ore body improves as further developed. The mine is worked to good advantage and profit. The dispute between this company and the Overman company, adjoining, about a certain portion of the mining ground, is still unsettled, and the Overman party continue in forcible possession.

OCCIDENTAL.

This mine is still closed, and nothing will be doing in it till it gets out of its present state of bankruptcy. Last March the stock sold for $15 and $20 per share, but now it will not sell at all; indeed, it is apparently found not worth quoting in the stock list. The Occidental is a good mine, nevertheless, and will come out all right, some day.

OPHIR.

Prospecting is being actively conducted, as usual, in the lower mine, with no ore developments. The present assessment of $2 per share becomes fully delinquent next Tuesday. The annual meeting of the company takes place on the 21st instant. That's what's the matter with the stock just now.

SACRAMENTO AND MEREDITH.

During the past two or three weeks much better ore than usual has been found in the upper workings of this valuable mine. The mill is running steadily and doing good work, and the general appearance and operation of both mill and mine betokens efficient and judicious management.

OVERMAN.

Daily yield, eighty tons, mostly from the Lambert and lower tunnels, with a few tons from the raise above the 400-foot level in the south portion of the mine. No new developments to report. Receipts for November, $50,580. An assessment of $2 50 per share was levied day before yesterday.

DANEY.

The new shaft is now completed to the depth of 300 feet, and drifting in the direction of the old shaft will be commenced next week, where there is known to be a fine body of rich ore. The drift will strike eighty feet below the bottom of the old shaft, and has about 200 feet to run in order to do so.

VIRGINIA CONSOLIDATED.

The west drift is still increasing its length in that direction. It has not yet cut vein matter, but will before long. Something good in the way of ore developments should be encountered by it at that point in the Comstock ledge.

SIERRA NEVADA.

The general appearance of this mine continues to improve, giving a better yield and inducing a consequent rise in the stock. No special new-ore developments to report.

Tennessee.

THE COAL TRADE.

A correspondent writes from Knoxville, December 29th, says: "The coal trade of Knoxville shows a favorable increase this season over last. The development of coal mines at Careyville, eight miles beyond Coal Creek, by KENNEDY and MORROW, the latter of whom is the present State Treasurer, and by Rev. J. F. SPENCE, who has contracted out his mine to old miners, promises to furnish employment for a good many more miners, and to furnish an abundant supply of the fuel. There is great need of more rolling stock in the trade. Many times the present amount of coal could find a ready sale were it available at the depots of the cities of Atlanta, Augusta, Macon, Chattanooga, and other railroad centres. There is but a slight competition. Coal is selling here at retail at 22c. per bushel delivered, the same price it was last season. There is no fluctuations in the coal market here in winter or summer; one old story of little capital and consequent lack of enterprise repeats itself year after year. The freights charged on the coal are enough to startle the Eastern roads. They are twelve dollars on a carload of coal of 9 tons from Coal Creek to Knoxville, a distance of 31 miles, over a grade that is not so very heavy but that one of the Baldwin locomotives can pull a train of ten cars of ten tons each. This extraordinary tariff is unvarying in regard to Knoxville coal, but reduces itself to one-half on foreign coal shipped on other roads. 'Circumstances alter cases' may be argued by a company who hold on to such ruinous charges, but will never justify them in this opening up of the virgin wealth of our own country. The Knoxville and Kentucky Railroad have thus accumulated enough in three years to place three locomotives and thirty coal-cars of the old gondola pattern, and one passenger-car and a hybrid of the baggage and second-class pattern, on their road. This does not seem satisfactory to supply so great a territory, as it must endeavor to do to keep up with the demand; nor can it, by any amount of showing, ever make their policy commendable. With the projected line to connect with Louisville, Ky., complete, may come a better era."

Colorado.

BULLION REPORTS AND MINING ITEMS.

From the Georgetown *Miner*, Dec. 5, we take the following items of mining news: "Drawings and specifications are being gotten up at STEWART'S for the mill of the Franklin S. M. Co. This mill is to have an Arey furnace, ten stamps and six Varney pans. The mill is to be erected at Masonville, below Idaho, on the site of the old Buford mill, formerly owned by the Federal Union Mining Co. The Franklin Mining Co. have a fine mine, which is capable of furnishing an almost unlimited amount of ore—indeed we know of no mine in Clear Creek county which can furnish so much. About one thousand tons of ore are now above ground at the mine, and the new mill will have all the ore it can treat. The Ianthe lode, situated on Leveanworth mountain, just east of the Idaho lode, is being worked by STOWELL & UTTER. The shaft is but about ten feet deep, yet the lode shows well, having about three inches of rich sulphuret ore, which will doubtless run well up into the hundreds. Some ore from this lode can be expected in about three weeks, and may be sooner, if the ore-streak should widen out. The Quaker lode, Sherman mountain, is looking exceedingly well. A drift is now being run about sixty feet from the surface. The ore vein in the drift is now about eight inches in thickness, and carries argentiferous galena, blende and iron pyrites. Some ore, about four tons in all, is being sent to HUEPENDEN'S for reduction. There is at the mine quite a quantity of second-class ore, which we understand is soon to be taken to the mill for treatment. The White lode, on Republican mountain, above the Hise lode, is now being worked by TOM. CAMPBELL, Esq., with most gratifying results. A shaft has been sunk to the depth of forty-five feet, and drifting and stoping to the east has been going on for some time. Mr. CAMPBELL informs that it is his intention to sink deeper on the lode and open up a large amount of ground for the cheap and rapid extraction of ore. The White is a large vein, and the pay-streak, although somewhat variable in thickness, has always been present in good proportion to the width of the vein, and at times is often as much as eighteen inches in thickness, with probably an average width of eight inches. The ore from the White is improving rapidly in extent and richness as greater depth is obtained, and the ore is now mainly sulphurets, with but little galena. Ore from the White lode has been treated in several mills, and has averaged in price paid per ton from $50 to $405 per ton, while the assay value varies from 52½ ounces to 362½ ounces per ton, the aggregate returns from over twenty-two tons of ore being $2,539, being a little over $113 per ton. This we call a most excellent yield. When this mine shall have been opened and placed in a good working condition there is no doubt but that it will continue to yield a handsome return for all the labor expended on it."

ITEMS.

"The O. M. lode," says the *Miner*, of date as above, "has been sending ore to mill during the past week. FIX & ANYON, who are working the Munsell lode east of the Discovery shaft, are doing well. They have about five inches of very good ore. The Brown Silver Mining Company shipped yesterday a 'button' of silver, weighing 231.75 lbs., avoirdupois, (3,378.9 troy ozs.); coin value, $4,392.57. Since our last report the Stewart Silver Reducing Company have shipped silver bullion to the amount of $7,018.64, coin. This is the largest week's work done by the mill since it has been started. The Ledge lode, on Leavenworth mountain, is being worked by D. CLARK. Last week this lode sent about two tons of ore to the mill for treatment. We understand that the lode is looking very well.

MARKET REVIEW.

The Coal Trade.

NEW YORK, Jan. 15, 1871.

WHOLESALE.—The strike throughout the entire coal regions, which our readers have been advised of from time to time, was duly inaugurated on the 10th inst. The market to-day, in consequence, is of a more decided character, and the unsteadiness noted last week supplanted by a general indifference on the part of dealers to sell coal. There is, however, a small business doing among retailers, whose stocks are too low to enable them to go through the next six weeks; from manufacturers who must keep their works going, and steamship companies who have no conveniences for stocking coal, and must buy from time to time as they need it. The prices asked for coal now are, $6 50 for Steamboat, Broken and Egg; $7 for Stove; $6 for Nut on board at Hoboken, Port Johnston, etc. Harbor freights are about 50c., which would make coal alongside and in carts from $7 to $7 50. There is very little coal being sold at these figures to retailers, as they would have to get from $8 50 to $8 75 to leave them any margin of profit. The stocks on hand at the East and in this city among retailers are fair, and no great necessity exists to buy.

There is no telling how long the present strike will last. It is well known to our readers that it was started on Dec. 1st by the men refusing to submit to a reduction in their wages by the three large companies. There will certainly be no overtures from the companies, who intend to hold out until the men accept their terms or offer some reasonable compromise. The companies are not willing to talk "bases" to any one, or acknowledge the miners in anywise as partners in their operations. During the last strike those men that work for the companies were not members of the Workingmen's Benevolent Association, and resumed work, not on the bases, but on special terms made with the various companies. This was in consequence of the strike being started by men outside of the company lines.

This time the strike is started by the company men, and they have found it necessary to join the W. B. A. in order to make it a success. The difference, then, in the present strike from the last is, that the men are now acting in union, and before were divided. Which will give way? As we stated above, the companies are resolved not to. Then the men must. How long before this will take place? When the surplus of coal is sufficiently worked off, so that the price of coal will not fall when operations are resumed. How long will this take? Probably from six weeks to two months. Taking the price of coal to-day at $6 50 on board, an announcement that a compromise was *talked of* would take all the stiffness out of the market, and reduce prices 50c. in one day—yes, in an hour. Were it *certain* that work was to be *resumed* in ten days, the price would recede to the very figures that caused the strike. Such are our immense facilities for producing coal, that a million tons can easily be put in the market in thirty days. Our readers must now judge for themselves; this *Journal* only proposes to be an auxiliary to assist them to conclusions. We don't care to prophecy, or write an article a column long, every third line of which would be prefaced by an "If."

RETAIL.—There is a fair trade doing. The Pittston Company still insist on selling coal at from $6 to $6 50, delivered, which precludes the possibility of much being done in other coals at higher rates. Some dealers in this city are, however, able to get $7 50 to $8 for Lehigh stove, from customers who don't care what they pay.

FREIGHTS.—There are very few cargoes offering, and quotations are nominal.

PRICES.—As quotations are only good from day to day, we think it useless to make any, as they would be calculated only to misled.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Jan. 7, 1871, compared with week ending Jan. 7, 1870.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila & Reading R. R.	17 237	297.641	74,085	43 i.658
†Schuylkill Canal	516	34.375	....	36.2 5
Lehigh Valley R. R.	37,458	264 8.9	56.403	3+0,0 8
Lehigh & Sus. R. R.	15,.15	15,015	31 7.7	31,737
†Lehigh Canal	....	....	....	....
Scranton North	....	....	....	....
" South	....	....	....	....
Penn. Coal Co., rail	12,068	12,068	617	617
" " canal	....	....	....	....
Del. & Hud. Canal Co.	....	....	....	....
" " R. R.	....	....	....	....
" " south	....	....	....	....
By Jefferson R. R.	....	....	....	....
Shamokin	4.202	4.202	6,463	6,463
Trevorton	4 7	497	....	....
Lykens Valley Coal Co.	1,.00	1.2.0	1,130	1,130
Wyoming South	....	....	....	....
Wyoming North	....	....	....	....
P. N. Y. C. & R. R. Co.	3.324	17 209	6.477	29,087
Williamstown, Cal'y.	2 86)	2,860	1,355	1,355
Short Mountain	....	....	....	....
Total	94,381	649,884	178 2 7	896.309
1870	....	....	94,381	649.884
Increase week and year	....	....	83,906	246,416

* Less coal transported for Company's use and Bituminous coal
†Closed for the season.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Jan. 7, 1871, compared with week ending Jan. 31, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	1,660	1,660	15,540	15,540
C. & O. Canal	....	....	....	....
H. & B. T. R. R.	4.181	4.181	3,339	3,3 9
Harrisburg & D.	4,593	41,096	5,642	13,638
L. V. R. R.	....	1,743	....	1,615
P. & N.Y. C. & R. Co.	3,090	19,038	3,782	21,798

Report of Coal Transported over Lehigh Valley Railroad

Three days ending December 31, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	12.042 19	57,131 18
" Hazleton	32,374 07	191,508 04
" Upper Lehigh	132 11	402 10
" Beaver Meadow	18,849 00	61,263 10
" Mahanoy	9.962 12	47,.0 09
" Mauch Chunk	149 08	899 13
Total Anthracite	65,515 17	358,395 04
Bituminous Coal from all sources		1,615 00
Total by rail and canal	65,515 17	360,010 04
Same time last year	42,.78 16	292,255 0)
Increase	23,137 01	67,755 04
Decrease		
Forwarded East from M'h Chunk by rail	56,403 05	309,006 13
Same time last year	37,4'8 10	264,819 13
Increase	18,944 15	44,189 00
Decrease		

RECAPITULATION.

Forwarded East from M'h Chunk by rail	56,403 05	309,008 13
To N. C. R. R., at Mount Carmel		
Forwarded North from L. & B. Junction	6,477 01	29,078 01
To L. & S. R. R. at Packerton for rail	443 18	1,739 19
Delivered at M'h Chunk	81 18	295 12
Delivered on line of road above Mauch Chunk	469 10	1,879 13
Delivered above M. Chunk for use of L. V. R. R.	1,640 05	6,306 15
To L. & S. R. R., at P'n Hav., for railroad		94 10
Do for canal		7,060 19
At M. Chunk for canal		2,431 02
Total Anthracite	65,515 17	358,395 04
Bituminous Coal		1,615 00
Total all kinds	65,515 17	360,010 04

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending January 7, 1871—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1871. tons cwt.	WEEK, 1870. tons cwt.	YEAR 1871. tons cwt.	YEAR, 1870. tons cwt.
Wyoming Region	2084 02	9876 01		
Upper Lehigh Region	3089 19	253 06		
Mahanoy Region				
Hazleton Region	509 07	144 17		
Beaver Meadow Region				
Tresckow Region	610 18			
Mauch Chunk Region	8205 00	6184 10		
Totals	33259 06	15458 14		
Increase	17800 12			
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	31757 13	15015 16		
Forwarded East of Mch Chunk by Canal				
Delivered at and above Mauch Chunk	1501 13	433 11		
Delivered to L. & B. R. R. at Plymouth Bridge		9 07		
L. V. R. R. at Sugar N.				
Totals	33259 06	15458 14		
Of the above there was transported on acc'nt of L. C. & N. Co.	8375 11	8613 19		
W.-B. C. & L. Co.	18483 13	4963 08		
Totals	26859 04	11307 07		
Increase	15551 17			
Decrease				

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via. the Pennsylvania and New York Canal and Railroad Company, for week ending January 7, 1871:

	WEEK.	LAST YEAR	INCREASE.	TOTAL.
Anthracite	6,477 01	3.328 12	3,148 09	29,087 17
Bituminous	3.7-2 00	3,090 00	692 00	21 798 00
Total	10,259 01	6,418 12	3,840 09	50,885 17

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending January 7, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	617 16	617 16	12,068 08	12,068 08
" Canal				
Total	617 16	617 16	12,068 08	12,068 08

Decrease, 1871, 11,450 12 tons.

Delaware, Lackawanna, and Western Railroad.

COAL Transported for the week ending Saturday, December 31, 1870.

	WEEK. tons. cwt.	YEAR. tons. cwt.
Shipped North	1,8 8.17	659,843 04
Shipped South	395.15	1,678.25+ 04
Total	2,204.12	2,368,101 08
For the corresponding time last year,		
Shipped North	12.453.13	453 172 18
Shipped South	27,620,13	1,110,815 01
Total	40,074.06	1,563,987 19
Increase		784,113 09
Decrease	37,869,14	

Shipments of Cumberland Coal

for the week ending Saturday, January 7, and for the year 1870:

SHIPPED BY	B. & O. R. R.	C. & O. CANAL.	TOTAL.
Cooke M	....	....	....
Borden	622 16	.....	622 16
Consolidation	3,177 14	.....	3,177 14
Spruce Hill	142 00	.....	142 00
Midlothian	944 03	.....	944 03
H. and Baltimore	130 01	.....	1.0 01
do Va M	9 9 16	.....	929 16
V C & I Co	864 14	.....	864 14
G. C. C. and I.	864 15	.....	864 15
Maryland	1.181 12	.....	1,181 12
American	1,122 13	.....	1,122 13
Atlantic	871 08	.....	871 08
Pied mont	1,184 00	.....	1,184 00
Swanton	2.6 05	.....	286 05
Barton	574 00	.....	574 00
Potomac	1,091 00	.....	1,091 00
Frankum	821 02	.....	821 02
George's Creek M. C.	293 01	.....	293 01
Big Vein	351 17	.....	351 17
Total week	15,450 17	.....	15,450 17
Previous		.....	....
Total year	15,450 17	.....	15 450 17

Statement of coal transported over the Cumberland and Pennsylvania Railroad during the week ending Saturday, Jan. 7, and during the year 1871, compared with the corresponding period of 1870:

YEAR.	WEEK. C. & O. CANAL. Tons. Cwt.	WEEK. B. & O. R. R. Tons. Cwt.	TOTAL. Tons. Cwt.
1871		13,297 08	13,297 08
1870		10,690 10	10,690 10
Increase		2,605 18	2,606 18
Decrease			

YEAR.	C. & O. CANAL.	B. & O. R. R.	TOTAL.
1871			13 297 08
1871			10,690 01
Increase			2,606 18
Decrease			

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, January 17, 1871.

	Total for Week.	Corresponding week last Year.	Increase.
Passing over Main Line and Leb. Val Branch	64,181 09	12,559 00	51,622 09
For Shipment by Canal	—	—	—
Shipped Westward via Northern Central R. R.	4,322 02	2,993 11	1,328 11
Shipped West or South from Pine Grove	305 04	114 19	190 14
Consumed on Laterals	3,8.5 01	1,441 11	2,383 10
Lehigh and Wyoming Coal	1,451 16	129 00	1,322 16
Total Anthracite paying fr'gt	74,085 12	17,237 12	56,8 8 00
Bituminous	9,842 15	4,623 00	1,219 15
Total of all kinds paying fr'gt	79,928 07	21,830 12	58,097 15
Coal for Company's use	3,655 09	1,010 18	2,644 11
Total Tonnage for Week	83 48) 16	22,841 1'	60,642 06
Since Dec. 1, 1870	415,901 18	361.292 07	54,6.9 11
Total to date	499,385 14	384,133 17	115,251 17

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	Increase.
From Schuylkill Haven	—	—	—
" Port Clinton	—	—	—
Total Tonnage per Week	—	516 66	—
Since Dec. 1, 1870	—	33,8 7 11	—
Total to date	36,225 17	34,373 16	1,852 01

Summit Branch Railroad Company.

The following is the quantity of Coal shipped from Williamstown Colliery, for week ending Saturday, January 7, 1-71 ..... 1,356 02
Same time last year 2.861 04
Decrease, Tons 1,505 02

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, January 13. R. A.	W. A.	AT PHILADELPHIA, January 14. R. A.	W. A.
Lump	$— —	$— —	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— — to —	— —
Egg	— to —	— to —	— — to —	— —
Stove	— to —	— —	— — to —	— —
Chestnut	— to —	— —	— — to —	— —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	— —	— —	— —	— —
Stove	— —	— —	— —	— —
Chestnut	— —	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.				
Diamond Vein	R. A. 6 00		— —	— —
New England	" —		— —	— —
Locust Dale	W. A. 5 50		— —	— —
Honey Brook, Leh'h	W. A. 6 00 to 6 50		— —	— —
Spring Mountain	" " 6 00 to 6 50		— —	— —
Sugar Creek	" " 6 00 to 6 50		— —	— —
Sugar Loaf	" " 6 00 to 6 50		— —	— —
Old Comp'y's	" " 6 00 to 6 50		— —	— —
Cross Creek	" " 6 00 to 6 50		— —	— —
Room Run	" "		— —	— —
Girardville	" "	5 50	5 25	— —
McMichael	" "	—	—	4 75
Shamokin	" "	5 50	5 25	— —
Lykens Valley	" "	—	5 75	— —
Broad Top	" "	5 50	— —	— —
Hill & Harris	" "	—	4 75	— —
Henry Clay	" "	—	5 00	— —
Powelton	" "	5 50	— —	4 75

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

January, 1871.

No quotations during strike.

	L.	Str.	Gra.	Eg.	Sto.	Ches
Scranton at E. Port	—	—	—	—	—	—
Pittston at Weehawken	—	—	—	—	—	—
Lackawana at do	—	—	—	—	—	—
Wilk'b're at Hoboken	—	—	—	—	—	—
Old Co. Lehigh at Pt. Johnston	—	—	—	—	—	—
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points, see "Freights."

Prices for Coal at Mauch Chunk.

January 1871.

	F. L.	Bro.	Gra.	Eg.	Sto.	Chest.
Lehigh	$3 00	$3 75	$3 75	$3 75	$4 00	$3 00
Wilkesbarre	3 00	3 75	3 75	3 75	4 00	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	4 75
Consolidation Coal Co.'s on board N. Y.	7 00
Maryland Coal Co. "	7 00

Prices at Baltimore—January, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 80@—
Pittston and Plymouth, do	5 80@5 75
Shamokin Red or White Ash, do	—@6 00
Lykens Valley Red Ash, do	5 25@—
Zerba Valley	5 25@—
Trevorton	6 00@—
By retail, all kinds per ton of 2240 lbs.	7 25@8 25
Georges Cre k & Cumberland f. o. b. at Locust Point fo cargoes	4 60@4 75
Fairmont and Clarksburg gas, f. o. b. at L. Point	6 00@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

January, 1871.

George's Creek and Cumberland f. o. b. for shipping ..$4 40

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@5 50
Lykens Valley	— —@5 25
Shamokin Red or White Ash	— —@5 75
Trevorton and Zerba Valley	— —@6 00

Prices of Gas Coals.

January, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 41-43 Pine st., N.Y.

Duty, $1 25, gold.	Coarse.	Slack.
Block House	$1 75 @- 75	
Gowrie	1 75 @- 75	

Corrected by Bird, Perkins & Job, 66 South street.

	Coarse Culm of Coal.
Pictou	$2 25 @1 25
Sydney	2 25 @- 80
Lingan	1 75 @- 80
Little Glace Bay	1 75 @1 00
Caledonia	1 60 @- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 75 @8 00
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co	$7 50 @- —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @- —
West Fairmount Gs Coal	8 00 @- —

AT PHILADELPHIA.

Powelton $7 80

Prices of Foreign Coals.

January, 1871.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street New York.

Liverpool Gas Caking	$ 9 00@— —
" " Cannel	11 50@12 50
" " House	—@15 00
" " Orrel	13 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel	18 00@20 00

For ton 2,000 lbs. delivered.

Foreign and Provincial Freights.

January, 1871.
Closed for the winter.

Foreign.
Newcastle and Ports on Tyne, per keel of 21 1-2 tons ..... £14 00@£15 00
Liverpool, 5 per cent primage ..... 13s @16. ton

TO NEW YORK.

Provincial

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Rates of Transportation to Tide Water.

Closed for the Season.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Port Carbon $2 00
Less drawback of 50 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 85
C. R. R., N. J., Easton to Elizabethport	1 21
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 40

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 84
C. R. R., of N. J., Easton to Pt. Johnson	1 24
Shipping expenses	25
Warfage	10
Total	$2 43

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 84
Morris & Essex R. R. Easton to Hoboken	1 36
Shipping expenses	25
Warfage	10
Total	$2 55

TO SOUTH AMBOY.

L. V. R. R.	84
R. & D. R. R.	} 1 14
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 23

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	84
C. RR. of N. J. Easton to Elizabethport	1 21
Shipping expenses	25
Wharfage	10
Total	$2 40

Freights.—January, 1871.

TO EASTERN PORTS.	From Philadel'a.	From E. Portland Port Johnston.	From Newbury...	From Rondout....
Amesbury	$2 50	$2 00		
Bangor	2 30	1 60		
Bath	2 30	1 75		
Boston	2 10	1 85		
Bridgeport	1 75	1 00		
Bristol	2 00	1 40		
Cambridgeport	2 75	2 00		
Derby	2 00	1 20		
Dighton	2 30	— —		
East Cambridge	2 35	2 00		
Fall River	2 60	1 40		
Hackensack	1 75	1 00		
Hartford	2 50	1 50		
Jersey City	1 40	60		
Middletown	2 25	1 25		
Mystic	— —	1 25		
New Bedford	2 00	1 40		
Newburyport	2 65	1 85		
New Haven	1 90	1 00		
New London	1 76	1 25		
Newport	2 00	1 40		
New York	1 35	1 50		
Norwalk	1 80	1 00		
Norwich	2 00	1 30		
Pawtucket	2 30	1 50		
Portland	2 30	1 50		
Portsmouth, N. H.	1 45	1 85		
Providence	2 00	1 25		
Rockport	2 10	1 65		
Saco	2 25	1 75		
Sag Harbor	1 70	1 20		
Salem	2 35	1 65		
Stamford	2 00	1 00		
Stonington	2 00	1 30		
Taunton	2 30	1 75		
Warren	— —	1 40		
Washington	1 25			
TO RIVER PORTS.				
Albany				
Catskill				
Cocksackie				
Coeyman's				
Cold Spring				
Fishkill				
Haverstraw				
Hudson				
New York				
Nyack				
Poughkeepsie				
Rhinebeck				
Rondout				
Sangerties				
Sing Sing				
Stuyvesant				
Tarrytown				
Troy				
West Point				
Yonkers				

METALS.

NEW YORK, January 12, 1871.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1¼ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, 7 ℔ ton; Polished Sheet, 3 cents ℔ lb.

	Store Prices.
Pig, Scotch No. 1, ℔ ton	31 00@34 00
Pig, American, No. 1	30 00@— —
Pig, American, No. 2	28 00@29 00
Pig, American, Forge	25 00@27 00
Bar, Refined, English and American	— —@75 00
Bar, swedes, assorted sizes (gold)	85 00@100 00

	Store Prices, Cash.
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	— —@110 00
Bar, Refined	75 00@ 80 00
Bar, Common	70 00@ 72 50
Scroll	97 50@125 —
Ovals and half-round	97 50@125 —
Band	92 50@ 95 00
Horse Shoe	95 —@— —
Rods, ⅝ to 3-16 inch	82 50@— —
Hoop	102 50@140 00
Nail rod, less 5 ℔ ct.	6¼—@— —
Sheet, Russia, as to Nos. (gold)	10½@—11
Sheet, Single, D. and T. Common	—4¾@— 6
Sheet, Galv'd, Nos. 14 to 26 10 and 12c. Nos. 27, 28, and 29, 13 @14	
Rails, English (gold), ℔ ton	56 00 @58 00
Rails, American, at Works in Pa.	70 00 @75 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 2½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15	@— 18
English Spring (2d and 1st quality)	— 7	@— 17
English Blister (2d and 1st quality)	— 10	@— 17
English Machinery	— 11½	@— 14
English German (2d and 1st quality)	— 13	@— 15
American Blister "Black Diamond"	— —	@— —
American, Cast, Tool	do. — 16	@— 17
American, Spring	do. — 9	@— 11
American Machinery	do. — —	@— 12
American German	do. — 9	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	— @— 37
Copper, Old Sheathing, &c., clean	19 @— 20
Copper, Chili Pig	— @— —
Copper, American Ingot	22½@— 23½
Yellow Metal, New Sheating	— @— 23
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 23

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1¼ cents ℔ lb: Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$—	@—
Spanish (gold)	6 25	@6 30
German, do.	6 20	@6 30
English, do.	6 25	@6 30
Bar (net)	8 75	@—
Pipe (net)	10 25	@—
Sheet	10 25	@—

TIN.—Duty: Pig, Bars, and Blocks 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent. ad val.

	Gold ℔ lb.
Banca	39 @
Straits	39¼@39½
English	39¼@39½

PLATES.

	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ℔ box	$8 25 @8 75	$9 50 @10 00
I. C. Coke	7 00 @7 50	8 00 @ 8 75
Coke Terne	5 75 @6 75	6 75 @ 7 25
Charcoal Terne	7 37½@8 00	8 50 @ 9 25

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ 100lb

	Gold.
Plates, Foreign ℔ 100 lbs.	$ 58½@ 6 12½
Plates, Domestic ℔ lb.	8¼@- 11¼

REMARKS.

IRON.—There has been an improvement in the demand for Scotch Pig, but holders are not inclined to sell except at full rates, the market closing steady at $31 50a33 for Glengarnock, from ship and yard: 125 tons sold at $32 50 from yard, and 50 do. Summerlee, $33. American continues in good request, but at lower prices; 500 tons No. 1 Thomas and Crane sold at $30, and 100 do. No. 2 Allentown $29. There has been very little inquiry for English Rails, but former quotations are maintained. American have been in improved demand at slightly advanced rates, and we notice sales of 5,000 tons at $70a73 cash, at the mills. The market for Rar from the store continues very dull, and the prices obtained leave no margin on on cost of importation—Refined laid down here from Liverpool costs $74 50 at dock, and is selling from store at $75, for usual sizes. American Refined Bar costs $72 50a75 at mill in Philadelphia, and $80a82 50 for small lots laid down here, and $77 50a80 for car-loads.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot is held firmly by the large holders at 22½c. for all kinds, but outside lots continue to be offered at less prices, and sales of such have been made to the extent of 250,009 lb. Lake at 22¼c.; and 50,000 lb. Baltimore, 22¼c., cash.; in addition to which, 50,000 lb. Lake sold at a private price.

LEAD.—Foreign is quiet but steady; 50 tons Spanish at 6¼c., gold. There has been an arrangement made between the manufacturers in this city, and prices are materially advanced. Bar is now quoted 8¼c., and Pipe and Sheet 10¼c., cash, less 10 ℔ cent. to the Trade only.

SPELTER.—Foreign is in limited demand; sales have been made of 29 tons Silesiah at $6 12½, and 25 do., to arrive, vessels due, at $6 81½, gold.

TIN.—The recent large movement in Pig concentrated the stock, and, the market being strengthened by the receipt of favorable European advices, prices harden and still tend in sellers' favor. We notice sales of 200 slabs Straits here, and 230 do. to arrive from Boston, at 39½ cents, with 34 now generally demanded; and 30 tons English, 33 @ 33½, held now at 33½ @ 33¾. Banca nominally 38 cents, all gold. The demand for Plates, stimulated by the causes noted in our last, has been active, and the business is large—prices are firmer and rather higher, some advance having been paid for small lots; the transactions embrace 6,000 boxes Charcoal Tin at $8 25 @ $8 50, now held at $8 62½ @ $8 75; 1,600 do. I. C. Coke, $7 12½ @ $7 25; 2,000 do. Charcoal Terne, $7 37½ @ $7 75; 100 do. M. F. do., $9; and 200 do. Wasters, $7 75, all gold.

STEEL.—Continues quiet and steady at previous quotations.

ZINC.—Am. Ox. Zinc, 6½a7c.; French, 10a11; Sheet, 8¼a9; Managanese, 4a4½.

Mining Stocks.

NEW YORK, January 12, 1871.

Mining Stocks are dull and prices are weaker. Sales of 100 Smith & Pormela were effected this forenoon at 25; 400 shares of Consolidated Gregory sold at 30, which transactions completed all of the tangible results of the Board, as far as we could ascertain.

	BID.	ASKED
Bates and Baxter	25	—
Benton	3	8
Black Hawk	20	40
Central Gold	7	15
Consolidated Gregory	25	50
Grass Valley	6	10
Gunnell	—	—
Smith and Parmelee	15	30
N. Y. & Eldora	—	—
Quartz Hill	10	—

San Francisco Stock Market.

We have reports per telegraph from the San Francisco Stock Market, dated Jan. 10. The most noticeable feature in the report is the price of Amador, which has gone up to 325. Below is the report in full:

Savage	52
Yellow Jacket	39
Kentuck	36½
Chollar Potosi	72
Gould & Curry	46
Belcher	7
Imperial	15½
Amador	3 25
Crown Point	—
Hale & Norcross	—

Petroleum.

Without exception, all of the Petroleum stocks on the list are lower than per last report. Below are the quotations in full:

	BID.	ASKED.
Bergen Coal and Oil	—	40
Bennehoff Run	15	20
Blood Farm	—	—
Brewsoort	—	—
Bliven Oil	—	—
Buchanan Farm	35	60
Central	65	70
Clinton	—	—
Home	125	180
Phillips Pet	—	—
Rynd Farm	25	—
United Petroleum Farms	14	16
United States	60	75
National	—	—
New York & Alleghaney	140	—
Northern Light	75	—
Pithole Creek	50	75
Rathbone Oil	—	—
Second National	—	—
Sherman & B	—	—
Tarr Farm	—	—

The Slate Trade.

[Corrected weekly.]

(A "square" represents 100 superficial feet.)

PRICES OF ROOFING SLATE.

Vermont purple, 1st quality, per square	$6 50@ 7 00
" green, 1st " "	6 50@ 7 00
" red, 1st " "	15 00@16 00
" variegated, "	5 75@ 6 20
Pa. b'k and d'k blue, 1st qual., "	6 00@ 7 05

PENNSYLVANIA SLATE TRADE.

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending January 7, 1871.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Girard Slate Co	87 squares.
Jones & Williams	— "
D. Williams & Co	— "
Saylor & Morgan	— "
H. Williams	— "
Lehigh Slate Co	— "
American Slate Co	— "
Hope	— "
Keystone	35 "
Locke	— "
J. Anthony	— "
Kuntz & Woodning	— "
Total	122 "

SCHOOL SLATES.

D. Williams	15 cases.
Lehigh Slate Co	2 "
Locke Slate Co	— "
H. Kuntz	— "
Total	17 "

BLACK BOARDS.

Yerkes & Martin	36 "
Lehigh Slate Co	2 "
Total	38

MANTELS.

Yerkes & Martin	24 "
Lehigh Slate Co	— "
Total	24 "

MILL STOCK.

Jones & Williams	— "
Philada. S. Mantle Co	— "
Lehigh Slate Co	— "
Yerkes & Martin	— "
	—

TILING, &C.

Lehigh Slate Co	— "
Yerkes & Martin	— "
R. Hughes	— "
H. F. Martin	— "
	— "

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Twin City Slate Co	— squares.
N. Y. & Penn	— "
J. M. Coffin & Co	— "
William Parry	— "
Mauch Chunk Slate Co	— "
J. Beck & Co	— "
Eagle Slate Co	210 "
Continental	— "
Heimbach Slate Co	35 "
R. R. Custer	70 "
Total	315

SCHOOL SLATE.

Harper & Cartwright	20 "
Total	20 "

Remarkable Discovery.

THE Los Angeles *News*, of a recent date, says: "By many it has been held as a theory that the Yuma desert was once an ocean bed. At intervals pools of salt water have stood for a while in the midst of the surrounding waste of sand, disappearing only to rise again in the same or other localities. A short time since, one of these saline lakes disappeared, and a party of Indians reported the discovery of a 'big ship,' left by the receding waters. A party of Americans at once proceeded to the spot, and found imbedded in the sands the wreck of a large vessel. Nearly one-third of the forward part of the ship, or bark, is plainly visible. The stump of the bowsprit remains, and portions of the timbers of teak are perfect. The wreck is located forty miles north of the San Bernardino and Fort Yuma road, and thirty miles west of Dos Palmos, a well known watering place on the desert. The road across the desert has been travelled for more than one hundred years. The history of the ill-fated vessel can of course never be known, but the discovery of its decaying timbers in the midst of what has long been a desert will furnish *savants* with food for discussion, and may perhaps furnish important aid in the elucidation of questions of science." All travellers to and from Arizona can, on a clear day, see the locality where the wreck is reported to have been found, from the stage road on the high mesa between Dos Palmos and Bitter Springs.

Water Supply of London.

A PARLIAMENTARY advertisement gives notice, by order of the Board of Trade, that a bill will be presented to Parliament next session requiring the water works companies supplying the metropolis with water to afford a constant supply, and requiring the owners and occupiers of houses and tenements to provide proper cisterns, stop-cocks, taps, and other appliances for preventing an undue waste and fouling of water, and to take water at a price to be fixed in the bill. There will be provisions for regulating and improving the quality of the water to be supplied, for altering and reducing the companies' charges, and for appointing officers for the purposes of the bill. There will be clauses to limit the companies' dividends, and to repeal the power to apply surplus profits in augmentation of previously declared dividends. The bill will contain provisions for the amalgamation of all or any of the water companies, and, if need be, dissolving some or all of them, and incorporating a new company or companies in their place. The bill will give power to the Metropolitan Board of Works and the City Corporation or Sewers Commission, jointly or separately, or some other body or persons to be named in the bill, to purchase compulsory, or by agreement, the property of the water companies, and to enter into contracts with them, or with other companies of persons, for supplying the metropolis with water, the bill giving all necessary powers for affording a better and cheaper supply.

Glasgow Pig-Iron Market.

The pig-iron market remains in a steady condition, the fluctuations being unimportant, with slightly more business doing; and till there is further development of political affairs much movement cannot be expected. The exports for the past week were 6,349 tons foreign, and 4,283 tons coastwise, making a total of 10,632 tons against 11,272 tons for the corresponding week of 1869, thus showing a decrease of 640 tons. This decrease would not have occurred had all the returns for the week been received; and as the decrease in the shipments has been reduced from 36,149 tons, at which it stood on the 20th September, to 7,137 tons, the activity in this department has been altogether unprecedented. The deliveries *ex* store are increasing, as the quotations for warrants admit of iron being taken out of store at lower prices than makers are willing to accept. The number of furnaces in blast has been reduced to 126, being seven less than the maximum number in the course of the year. Four have been blown out lately—two at Govan, one at Shotts, and one at Langloan. Some of the ironmasters at present prefer to sell their coals in the open market to producing pig iron, as the former is more profitable. Yesterday's quotations were 51s. 5d. to 51s. 4½d. cash, and 51s. 7d½. a month. The prices a week ago were from 1d. to 2d. higher. To-day the market opened flat; 51s. 4d. a month and 51s. cash were taken, and at the close the price was 51s. 2d. cash. The news regarding the Luxembourg question caused a good deal of excitement on 'Change, and affected the prices of pig-iron.—*Engineering.*

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" The great friction of produced by one mode of ventilation, and how reduced by another
" Pure added to impure (plans.
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The Alpine Tunnel.

Seven Miles Through Schist and Quartz—The Great Excavations —Triumph of Modern Engineering—Compressed Air— Forcing a Path Through Rocks—An American M. C. in the Great Italian Bore.

Extracts from a letter of S. S. Cox to the N. Y. *World*, 1869.

Shortly after the annexation of Savoy to France, which was on the 24th of March, 1860, Sardinia, guided by CAVOUR, confided to eminent engineers the study of the line and work. They agreed at once on the initial points. The line by the Valley of the Doire and Arc, with the piercing of the Alps under the Pass of Frejno, which is now followed, was then deemed the best. Since 1843 all studies have ended in the conclusion that this is the best line. Geology and experiment confirm the conclusion. The fear was that this line would encounter obstacles, such as granite, serpentine, water sources, etc., only to be surmounted with enormous outlays. Geological researches then began. I am indebted to a pamphlet written by a Dr. BONJEAN, of Chambery, for interesting information on this head. He says that M. GABRIEL, of Mortillet, civil engineer, Professor of Natural History at Annecy, gave himself to the study of this project and to describe the nature of the soil, or of the rocks which the tunnel ought to traverse. Here are the conclusions of the report of this geological savan of Savoy, dated the 12th December, 1856: The rocks between Fourneau and Bardonneche are according to the following order, beginning at Fourneau:

First—Micaceous sandstone.
Second—Quartzites.
Third—Masses of anhydrous and crystallized gypsum.
Fourth—Loose limestone.
Fifth—Slaty and chalky schist.

All these rocks, except the quartz, can be easily worked; far from offering difficulties for the piercing of a tunnel, they are the most favorable. The columns of water, then, seeing the nature of these rocks, are not to be feared. Thus the study of M. GABRIEL, in confirming previous studies, have shown today, when the piercing has reached more than the half of its length, that the direction given to the line was the best, not only in the light of skill, but still more with reference to geological conditions and the facility of execution, and these with reference to time and expense.

This important work received the sanction of other distinguished engineers and savans, including Professor LISMONDA, of Turin. Then followed projects of law and commissions frum the State. The Government of VICTOR EMMANUEL, strong in the discovery of the machine of Messrs. SOMMEILLER, GRATTONI and GRANDIS, undertook the work, though as colossal, and, perhaps, as bold and glowing for the century and for Italy, as the piercing of the Isthmus of Suez! A rough sketch of a bill was presented upon this subject to the Sardinian Parliament at the commencement of 1857. On the 5th of July of the same year the Senate approved the report of the committee, composed of five members, among whom were the astronomer PLANA and General MARMORA. As all these projects, laws and conclusions were impotent, but for the invention of the piercing machine, by which the scheme was made comparatively inexpensive, in time and money, it may be interesting to trace the origin of its invention. The engineers who were the inventors of the new system of hydro-pneumatics, had made with the Government a contract to apply their system and diminish the expense of the traction at the pass of the Giovi, on the route to Genoa. But in making the machines they made a new discovery. They informed the Minister of Public Works of it. The calculations of science brought them to conclude, not only that their discovery was very important, but still more, that it could be applied to the piercing of the Alps with great economy. The Minister desired them to occupy themselves exclusively in constructing their machine to the necessary size. As soon as it worked its efficacy was manifested in an astonishing manner. Thus it worked: The compressed air has a pressure of "six absolute atmospheres," and is forced into a reservoir, where it is confined. From the reservoir it can be transmitted from any distance by means of caoutchouc or cast-iron tubes, whether to act as motive power, or to transport into the galleries the air necessary to dissipate the gas developed by the powder, the lamps, and the respiration of the workmen. In fine, this motive power is applied to a perforating automatic machine. It acts on the excavation with a speed ten-fold that of manual labor.

The next point was to find sufficient falls of water in the Doire valley, to feed the machine in every season. This was ascertained, and since the commencement of 1863 the compressors have been at work on two sides of the tunnel. The government named a commission to study the system, and to submit it to all experiments as well as scientific calculations. This commission was composed of several notabilities. Its report, presented by Mr. GIULIO, confirmed all desired results. After the adoption by the minister and the Chambers of the several reports, the work commenced in great earnest. The years of 1858 and 1859 were employed to create, not without enormous difficulties, in a locality denuded of resources, the roads, lodgings for men, buildings for works of construction and reparation of the machines, diverting the water, hydraulic constructions, etc.; and in 1861 they made at Bardonneche, on the Italian side, the first experiments with the new perforators. The success was complete.

Ordinarily, for the formation of tunnels in railways, they work not only at the two extremities, but make also vertical shafts, by means of which the perforator is established at several points of the gallery. It happens thus—by means of these shafts which ought to arrive at the point of piercing—that one can employ several bodies of workmen to accelerate the work. But the application of this system here was impossible, the floor of the gallery being about 1,600 metres, or about 5,000 feet (there are 3.281 feet to one metre) below the height superimposed; and here pressed a crowd of difficulties. The most serious was that of time; for in this manner, working only at two points, thirty-five or forty years would be necessary to complete the work. The machine met and overcame this difficulty. Motive power for the machines and vital power for the workmen; these obtained, the next thing was a machine of the size and kind adequate for the Alpine work. M. MAUS, a Belgian engineer, made the first one. If you can make a cut of it, as here presented, it will illustrate, better than my cloudy text, its precise plan and function.

The perforator is provided with two horizontal cylinders. The one (A) is fixed and moves all parts of the machine, except the machine for percussion. The other is movable, called B. A gives to B a slow movement forward and a quick return, and the movement of rotation. B has but one effect, viz., upon C, the steel chisel or point, the power of which pierces the rock. The whole is fixed on an iron frame, and this frame on an iron car, which car is moved on a rail with the air-power. It has ten perforators, and a tender for the water, etc. When the perforations are made, the car and tender are retired three hundred feet for the explosion.

The perforator generally gives two hundred strokes a minute; and can give three hundred. There is what is called the advancing gallery made by the machine. The work has two other divisions; the explosion and the clearing out the debris.

The variety of functions performed makes the machine a wonder. It comprises: 1. The agent of percussion, which advances into the rock, the steel points forming grooves, which detach the rock by means of wedges. 2. The fixed machine which transmits to the percussion the motive force coming from the mouth of the tunnel by hydraulic wheel and cables. 3. The engines and the mode of transmission of the motive force.

When studied at first, by a commission named, 13th July, 1849, by M. GALOAGUO, Minister of Public Works, this machine, which avoided the use of powder, was regarded as reuniting all the proper conditions to success; but the essential point of ventilation had not then been sufficiently studied, and at first they were obliged to abandon the project, as much for the lack of ventilation as for the difficulty presented by the mechanical system.

Some time after another mode was presented by an Englishman, M. BARLETT, who, in order to facilitate the boring of the gallery, had adopted a steam machine, making a perforator move by means of which the perforations were made eight or ten times faster than by hand. But this steam machine could not be used in a gallery as deep as that of the Alps, because without the air—the aliment of combustion—it could not have steam. It is the air which is lacking, and this the Savoy machine provided.

The next point was the rocks, and from which side, or whether from both sides, should they begin? It was soon ascertained that the rock difficulties would be greatest on the western side. There were found quartz rocks—the compact quartz, as well as sand and pudding-stone of the two last stages whilst the Italian side offered only the schistose limestone, quite easy to excavate. Results have certified to the geological prevision. Beds of anthracite and lead have also been found. But the great impediment is not in the metallic strata, though these mountains are rich in ore, but in the quartz. They have been working in the latter since June 15, 1865. It is hard, hard work. Messrs. MEISSONIER, chief engineer of the mines, and LACHAT, second engineer, have published in the catalogues of minerals useful to Savoy, sent to the exposition at London, 1861, a report of this gigantic work, as well as upon the method to conduct it speedily to an end. I extract from it the essential part, and in addition all the changes and modifications to this day in every part of the work.

This tunnel will be for two lines. The space is six metres (about twenty-five feet) wide from side to side, and 7.72 metres at the base of the piers. At Modane the vault is in the centre; at Bardonneche it is elliptic, with a height of a foot more than at Modane, in consequence of the excess of the pressure, owing to stratification almost horizontal. The lining walls of stone have a thickness of two to three feet, according to the weight of the earth.

The work was commenced and prosecuted in the ordinary old way until the end of 1862. They advanced thus in one day nearly two feet, that is to say, in the softer stone. They advanced then almost as rapidly with the hand of man as now in the quartz with machines. The lining wall follows as rapidly as the boring is made. The work is prosecuted by relays every eight hours. As I have already explained, the work of excavation is still made with powder, after the orifice is made by the perforators. But the compressing power itself receives its motive from water; so that water, you see, plays more important parts in the theatre of enterprise than we imagine.

The water course, utilized on the eastern side, is the Milezet. It is brought from a distance of over 12,000 feet by splendid works. At Modane, on the western side, it is the Arc, but as it has not a fall sufficient to move wheels of fifteen feet diameter, they have established along this river a grand canal, in masonry, which commences about 200 feet distant from the works. The "compresseurs a choc" number ten on each side of the tunnel. At Bardonneche, since the opening on the 26th of January, 1863, simultaneously with the new system, they have used compressing pumps, by means of a column of water coming from a basin 100 feet above the point of its fall. These compresseurs give four pulsations a minute, which produce 560 litres of air, at six atmospheres, making 5,600 for ten. A litre is over a pint and a half. At Modane the "compresseurs a choc" have not been employed, as the fall and the quantity of water were not found sufficient to act conveniently upon the pistons.

The "compresseurs a choe" have the form of a syphon reversed, with two valves (soupapes)—the one for the admission of the water which works, the other to empty the water which has worked, and at the little vertical branch three more valves, of which two are for the admission of exterior air to be compressed, the other for the emission of the compressed air. The two first valves are moved by two independent machines, called "aeromoteurs" of the force of twenty-eight horses, and similar to a vertical steam engine. The valve of admission communicates with the atmosphere; that of emission conducts to large reservoirs, in form of boilers, to the number of ten. These reservoirs serve as depots for the compressed air, to utilize it either for the perforators or any other work. The pressure is rendered constant by a column of water. This column of water permits in its state of compression only to six atmospheres; but the compresseurs being able to compress ten atmospheres, they have invented a regulating governor, which permits in eliminating the column compression to that degree. The result is that in twenty-four hours 86,400 cubic metres can be introduced into the tunnel.

In the tunnel about three hundred and fifty workmen are engaged in working at once, by relays of eight hours. Each company of laborers would have the third of 86,400 cubic metres of air, which would give for each man eighty-two cubic metres in eight hours. If one considers that a man can live at ease during twenty-four hours with ten cubic metres of air, supposing that the lights absorb as much oxygen as a person, there would yet remain forty-one cubic metres of air for each individual; that is to say, four times more than is necessary. So that, in fact, a man is better off under the Alps than out. The ventilation of the tunnel up to this time has not required any special care. When required, a plan is at hand by which, in dividing the tunnel into compartments, the bad air can be expelled, and without being inhaled by the workmen. The cost of these processes depends on the kind of rock worked. The quartz costs nearly twice as much to perforate as the soft stone. A few other items and we will leave this business. The temperature of the gallery, in every season, is from 20° to 22° centigrade, which is 70° Fahrenheit; rather warm. The workmen have to dress light in winter, and watch themselves when coming out into an atmosphere 30° colder. Not the least interesting part of these processes is the determination of the line of work. Observatories are fixed at the entrance on each side. The theodolites are fixed in them. The tunnel is lighted, the further end by a strong magnesium light. The observations are taken every six months. There is a difference between the height of the two entrances of nearly 1,000 feet. The Savoy side is nearly 4,000 feet above the sea level. There have been on an average about 2,500 persons employed in the tunnel. The cost, when completed, has been reckoned to be sixty-five millions of francs, one-half of which will be borne by France. Of the other half, much of it will be borne by the "Victor Emmanuel Railroad," connecting the tunnel with Turin.

Prizes for Discovering Coal.

A CORRESPONDENT inquires whether the State of New York offers a bounty for the discovery of coal within its borders, and says, if it don't, it ought to. He instances the case of DRAKE, who discovered oil in Pennsylvania, and died after all in a poor-house. This, says our correspondent, was a disgrace to Pennsylvania.

Returning to the bounty question, he alludes to the verdict of the geologists that "there is no coal in New York State; or if there is, it lies so deep that it won't pay to look after it," and adds, "Let a premium be offered by the State of ten thousand dollars, as I have heard it was, and I know the man that will look after it. Also the same on oil; and my prediction is that one or both will be discovered in less than two years, perhaps in one."

We reply to these suggestions:

1. We are not aware of any bounty offered by the State of New York for the discovery of coal.

2. We think the offering of such a bounty would do much harm, in stimulating ignorant persons to spend time and money in a fruitless search.

3. The geologists do not say that if there is coal in New York, it lies too deep to be worked. What they say is, that the rocks of New York are already lower than the coal formation, so that, the deeper we go, the worse off we are.

4. Oil and coal do both exist in New York, but neither in paying quantities, so far as operations have hitherto shown.

5. Finally, if any man should, in spite of the geologist, find a workable bed of coal or a paying well of oil in this state, he won't need any paltry bounty of ten thousand dollars to pay him. And if he should get a bounty, it wouldn't necessarily keep him from the poor-house. DRAKE, if he died a beggar, did so in spite of a bounty which, according to our recollection, was given him by the citizens of Pennsylvania.

Standard Ton for Gold Quartz Mining.

A CORRESPONDENT from Madoc, Canada, writes:

TO THE EDITOR—SIR: In quartz mining and crushing, what is the customary standard for a ton—2,000 lbs., or 2,240 lbs.? The latter, in a run of one hundred tons, would materially enhance the yield. As I am directly interested in the point at issue, your opinion, expressed when convenient, in your journal, will confer a favor on Your subscriber, L. K.

In this country the ton of quartz is almost universally reckoned at 2,000 lbs. Assays are made to this standard, and in giving the yield per ton, as shown by actual work, the same unit is retained. Our correspondent is quite correct in assuming that 2,240 lbs. ought to contain more gold than 2,000 lbs. of the same ore. He does not express the matter very clearly, but this seems to be his meaning.—ED.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor.

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More Mining Bills.

THE Congressional Committees on Mines and Mining will not have so easy a time of it hereafter as heretofore, if we may judge from the number of measures relating to those subjects which have recently been in one or the other House. We have this week to record two more—the Senate bill of Mr. COLE, "For encouraging the development of the mineral wealth of the United States, and incorporating the United States Mining School and Metallurgical Company," and the House bill of Mr. JOHNSON, "Authorizing the establishment of a bureau for mining the precious metals and providing for its inauguration and support."

Both these bills have been referred to committees, and may never be heard of again in their present form. We ought, before commenting upon them, to say that we have no reason to suppose that the gentlemen who introduced them are their authors, or even particularly favorable to them. Measures are frequently introduced by Senators or Representatives to oblige constituents or friends; and this, we infer, has been the case in the present instances. Neither Mr. COLE nor Mr. JOHNSON, both of whom are citizens of California, would be likely to commit himself in favor of such plans as these two bills propose.

The first of these bills incorporates "The United States Mining School and Metallurgical Company," and provides that the said company shall "establish and conduct a school of miners for instruction in geology, mineralogy, chemistry, metallurgy, and mining engineering, which school shall be free, and open to citizens of the United States, under regulations to be prescribed by the board of directors."

The company is further authorized to construct and conduct metallurgical works, and to purchase, or work by contract, ores of gold and silver. The location of the school and the metallurgical establishments (of which there may be five in all) is left to the directors, except that the school and the metallurgical works first erected shall be at a point convenient for water, fuel, and transportation. The stock of the company is to be ten million dollars, and the organization may be perfected as soon as one-tenth shall have been subscribed for and ten per cent. of that paid in. The actual minimum capital is therefore one hundred thousand dollars.

Up to this point the scheme is not objectionable, except in so far as it seems quite unnecessary for anybody to apply to Congress for authority to carry on in good faith a business which is free and open to all citizens. Everybody who chooses can start a school or build a furnace; and, if he is not a fool, will locate them at convenient points.

But the tenth section of the bill provides that this public-spirited company shall receive one million dollars in U. S. bonds, as soon as the buildings for the school and metallurgical establishment are completed (the school to accommodate three hundred students, and the works to be capable of treating monthly not less than four hundred tons of galena ore containing silver, five hundred tons of argentiferous ores, two hundred and fifty tons of copper ore containing silver, and two hundred tons of auriferous sulphurets per month). For every additional metallurgical establishment of the same capacity, half a million more is to be paid, until three million dollars in all shall have been so issued to the company. A few thousand acres of public land are thrown in for building sites.

The United States, in other words, is to give away this vast endowment, without any return except the public benefit to be expected from the school and the smelting works. But the company is not forced to continue the school or the works, nor subject to any penalty if it shuts up the whole concern, as soon as it has received its bonus in bonds. Nor is there any condition imposed as to the courses of study or the management of the institution.

As for the smelting-works, they spring up of themselves where they are needed and will pay; and this association of highly-endowed gentlemen will certainly not maintain them where they are not needed or do not pay. With the school the case is different. A school of mines is a good thing, and it must be supported by something besides the fees of students; but a *free* school of mines is not necessary, and, moreover, of all the ways in which such a school could be established or assisted by the government, the plan of leaving it to a stock company, engaged at the same time in a most precarious commercial enterprise, appears to us to be the worst that could possibly be devised. When the United States is ready to give one million or three million dollars for these purposes, the money can be much more safely invested.

The other bill to which we have alluded is still more magnificent in its character. It proposes a large bureau, with an army of chiefs, deputies, clerks, assistants, inspectors, supervisors and adjuncts, to say nothing of boards and councils, laboratories, reducing works, experimental shops, cabinets, galleries, libraries, and a Mining Monthly. The salaries of the officials are to be truly gorgeous, ranging from $1,000 for the lowest messenger up to $10,000 for the Big Chief. Their functions are described at great length, with much literary flourish, and very little legal accuracy; but after some deep study, we find that the main purpose of the bureau is to be to lend money, "not exceeding two hundred and fifty thousand dollars in any case, and not aggregating for any year twenty-five millions of dollars," to meritorious quartz, placer and tunnel mining companies. The inspecting and reporting and reducing and monthly editing appear to be all subordinate to this. We need hardly occupy space with the arguments that occur to us against so cumbrous an apparatus for so mischievous a purpose. Certainly JAMES A. JOHNSON, of California, who introduced the bill, never wrote it. He has too much practical common sense to conceive the unwieldy plan as a whole, and too strong a sense of the ridiculous to commit such ludicrous blunders as it exhibits in details.

The Removal of the Obstructions at Hell Gate.

THE importance to our shipping interests of a safe entrance to New York harbor through Long Island sound and the East river, is too palpable to need argument. The discussion of plans for the modification and circumvention, but principally for the *removal* of the obstructions to this passage which now exist at Hell Gate, in the East river, has interested many eminent engineers, and occupied at various times considerable public attention. A glance at a chart of the rocks and currents of Hell Gate reveals the fact that the remarkably dangerous character of this vicinity is owing to two combined circumstances, namely: (1.) The Currents; (2.) The Rocks and Reefs.

The strong and tortuous currents are certainly beyond the direct control of human agencies. They may, however, be modified, indirectly, by the removal of the prominent rocks which most affect their dangerous direction and intensify their power. The first in importance of these rocks, on account of its position relative to the course of the channel above and below it, is the submerged portion of what is known as Hallet's Point. This is a "nose" of rock very regular in shape, jutting out from the Long Island shore, just above Blackwell's Island. It extends outward about three hundred feet, where, by an almost gradual descent from the shore, it reaches a depth below low-water of thirty feet. It is estimated to contain about 80,000 cubic yards. The United States government propose, by the removal of this point, to widen the channel to the present line of the shore, and to render it capable of being deepened, by the subsequent removal of broken stones, to a depth of thirty feet below mean low-water mark.

To accomplish this object it is intended to completely undermine the point by a cellular system of tunnelling, leaving only a "shell" or "crust" of ten feet thick, supported underneath by pillars. These pillars, left standing, will contain the explosive agent which is to be ignited simultaneously in all, and the mass blown up and broken into pieces of not over twelve tons in weight. The work was begun here in November, 1869, by sinking a large shaft into the rock at the water's edge. It is nearly semi-elliptical in shape and extends out about 100 feet into the water, being protected by a coffer-dam ten feet high. It was carried to a depth of thirty feet. From the inside face of this shaft and on a level with the bottom of it, "tunnel headings" are to be run out horizontally in every direction under the rock. These headings are ten in number, and average 300 feet in length; they have a general width of ten feet at the bottom, and are slightly arched at the top. They vary in height from sixteen feet at the shaft to nothing at the termination of the heading. At intervals of fifty feet along their length they are connected by a series of concentric galleries. The excavation of these headings and galleries leaves the supporting pillars. These are finally pierced by an excavation whose ground-plan resembles the letter "T." The powder is placed in recesses corresponding to the pendants of the letter.

The aggregate length of the excavations is 7,956 feet—composed of 3,004 feet in the headings; 2,275 feet in the galleries, and 2,677 feet in the powder chambers.

The broken stones remaining in the river after the mass has been blown up are to be removed by a boat, suitably provided with grapnels and steam gearing. This operation, it is anticipated, will be attended with considerable danger from collision with passing vessels. The current running with a velocity of from five to eight knots an hour is transformed by the obstructing rocks and reefs into counter-currents and eddies, under the influence of which a vessel can be only very imperfectly controlled. It is reasonable to expect that the same force which carries a vessel helpless on the rocks may cause unavoidable collisions with the working boat. For this reason, the size of the pillars will be decreased as much as possible, consistent with their essential objects as supports, leaving as little to be blown up as shall be found consistent for the safe working of the excavations. Hallet's Point consists of a huge mass of the gneiss, which constitutes the bed-rock of the entire upper portion of our island. Veins of solid mica, and of a mixture of mica and quartz, varying in thickness from an inch to two feet, are found at intervals running through the entire mass.

The mineral constituents of gneiss are essentially the same as those which compose granite. In the latter, however, the plates of mica lie in a number of different planes, while in the former they are parallel. This is, mineralogically speaking, the only difference in the two varieties of rock, and the one frequently passes almost imperceptibly into the other.

In one of the headings a marine shell is said to have been found in decomposed mica, which is a curious geological combination. Some idea of the nature of the difficulties of drilling in this rock may be formed, when it is stated that to sink an inch and-a-half hole one foot deep in the mica blunts from eight to twelve drills, in the ordinary gneiss from twelve to twenty-two drills, and in the hardest kinds of gneiss from twenty to twenty-six drills of the best English steel. The drilling for the shaft was done principally with the Diamond and Burleigh steam drills. The excavation of the headings has been done during the past four months by hand-drilling entirely; and from very careful records kept during this time, under the direction of General NEWTON, he is prepared to make a very minute comparison between this method and the proposals he has advertised to receive for compressed air drilling. The rate of progress has been about eight feet forward, in each heading, a month. The powder used for blasting has from three to four times the explosive force of powder of ordinary composition. Other explosive agents have been used for experimental purposes, but without sufficient success to warrant the adoption of any of them. A compound having from ten to forty times the explosive force of powder is found to open the seams and fissures in the rock through which the water percolates, if the charge is placed in the upper half of the heading. In other portions no hole is required deep enough to utilise the full force of a higher compound than that now used, which is put up, at the works, in water-proof cartridges, containing from half a pound to two pounds.

The responsibilities connected with the charge of this important work has been fitly given to General JOHN NEWTON, of the United States Engineers. He is efficiently assisted by Mr. REIFHEIMER, superintendent at the works, whose familiarity with works of this nature was acquired from experience in Europe. The force employed numbers about one hundred and fifty, mostly Cornish men. They are divided into three "shifts"—each working eight hours—and thus the work continues uninterruptedly day and night. General NEWTON signifies his intention of pushing the operations to a completion as rapidly as consistent with safety and ultimate success; and, appropriations not failing, expects to complete the removal of this obstruction within two years.

We do not Sell Patents.

WE are constantly receiving letters from parties in every section of the country, requesting us to interest ourselves in some patent, or asking our opinion as to its utility, or applicability, without even enclosing a stamp for our reply. We wish respectfully to inform such friends that we do not sell or traffic in patents in any manner, that all our capital and force are employed in the publication of our papers, and procuring patents in all the countries where patent laws have been established, and prosecuting all patent business entrusted to our care—except the selling.

With respect to the value of a patent, we have also to say, that this mainly depends upon the parties' diligence and the means employed in bringing their inventions properly before the public. Some patentees introduce their inventions to the public by enlisting capital, and manufacture the article under the patent. Some both manufacture and license others to do so, while others sell out their interest in territorial rights. Many other means, also, are resorted to by inventors, as well as by assignees, to remunerate themselves for their time and the outlay that they have already made in the interest of the patent.

All these various methods of obtaining money under the protection of a patent right are exclusively commercial in their nature, and entirely foreign to our business. We know that chances are frequently offered for making considerable sums of money by speculating in these claims, and the same may be said of stock operations in Wall street; but we have no desire or intention of dabbling in the one any more than in the other, nor has the former any more connection with our legitimate business than the latter.

Our sympathies are with inventors, and we feel disposed to assist them in every way we can, consistent with our own interest, for we do not believe that any class has received so little for their services, and to no class is the world more indebted. But we cannot speculate in patents, for reasons that will be obvious upon reflection to every intelligent man. This should not, however, discourage any one. The field of invention has only been entered, and lies almost unbroken before us. The work of enterprise and invention is hardly begun.

Royal Scottish Society of Arts.

AT a late meeting of the Royal Scottish Society of Arts, Dr. STEPHENSON MACADAM presiding, a paper from Mr. J. WINTON, engineer, Portobello, was read: "On a Simple Means for the better Distribution of Water into Household Cisterns." Assuming that ¾ inch pipe is sufficient to supply five cisterns for twenty-two families, he pointed out that when the large ball-taps or ball-valves are running full bore at the bottom of a house, the pressure in the pipes is so much reduced that little or no water finds its way to the top flat. To cure this evil—which, he held, was due not to the supply pipes being of an uniform size, but to the large size of the ball-taps—he proposed to throttle the supply to the cisterns by fitting to the end of the spout of the ball-taps a nozzle-piece having a much smaller aperture than the existing ball-taps. For the two bottom cisterns he would allow a nozzle with an aperture of 3-16ths of an inch in diameter, and for the others ¼ of an inch. By this means the pressure would be maintained in all the ¾ inch pipes to the cisterns. Such a plan, if carried out, would greatly improve the distribution, and reduce the waste of water. He calculated that the expense of fitting the nozzles would be 1s. per ball-tap, or, supposing there are 40,000 cisterns in Edinburgh, £2,000 in all. The saving, however, would be enormous; and it would not be necessary to expend £400,000 in providing a fresh supply of water. Mr. SANG agreed with Mr. WINTON in thinking the present supply of water to be sufficient, if provision were made to avoid waste. At the present time more than half, he believed, was pure waste—just thrown away; and he thought some step in the way of economising the water should be tried before setting to work to bring in a new supply. The chairman differed from Mr. SANG, and did not think that the present supply of water was sufficient for household purposes. Nor did he agree in applying the term "waste" to the water that escaped and flowed down the drains. A certain amount of water was necessary to flush the drains and to carry away foul matters; and therefore he did not look upon water as waste when it was employed in this operation, although it might not be used for household purposes. The paper was remitted to a committee.

South African Diamonds.

A correspondent at the Diamond Fields writes to *The Cape Argus*, dating from Pniel, Dec. 5:—"As to finds, they have been turned up in considerable numbers of late, but the heaviest I have heard of is not more than 17½ carats; another has been reported of 17 carats, another of 11 carats, and another of 10½. The next run from nine to seven and down to very small figures. New places are being discovered. I have already mentioned SIPONELL'S ground. Mr. GLYN has told me that when he was down there the other day, he saw fifty diamonds which had been found there. A week or two ago there were 150 people there; now there are 250, and people are moving down rapidly. A rush has been made to a place eight miles below Kizikanna; also to a spot not far from Pneil. The 'Rich Coppie,' at Kilpdrift, is again being worked, and not without success. Hebron is also commanding attention. Pniel still holds its own, and is becoming crowded. The natural wealth in diamonds of the Vaal banks appear to be extraordinary. To talk of exhaustion is to talk of something that may come to pass next century, perhaps. At present work is everywhere rewarded—not every man's work, but, taking the labor given to the fields as a whole, it is undoubtedly fruitful. As an instance of marked success, I may mention Mr. RAWSTELL of Hopetown. He has just left the fields with diamonds worth £12,000, the largest being 80 carats. He has about fifty stones in all. There are not many Mr. RAWSTELLS. While out walking the other evening, a young fellow asked me to buy his walking-stick. He seemed ashamed to put the question, and would not have done so had he not been in want of a shilling. A gentleman told me a day or two ago that he had just had thirty applications from destitute white men for a job of work. The RAWSTELLS are few. For one RAWSTELL, how many tens, scores, and hundreds are there who are bitterly disappointed? Notwithstanding all the brilliant instances of success here, I would not advise any one to try the diggings. I can tell you another story of success. An old couple—a Dutch farmer and his wife—were driving a wagon-load of wood, the other day, down to the drift here, when, lo and behold, a diamond of 17½ carats blessed their sight. There it lay in the road. They grabbed it. What a lucky old couple! This has been told to me by a truthful man. But, let no old couple at Cape Town, or anywhere else, imagine that they would have the slightest chance of picking up a diamond at the rift, were they to come up. Such a thing happens once in all time.

"It will help you to form some notion of the happy frame of mind in which the Pniel diggers are, when I tell you that the owner of a merry-go-round is making his fortune here. Grown up, heavy-bearded men, who have been working hard in the pit or at the cradle all day, mount the wooden horses, and are whirled around for ten minutes at a shilling a ride. Well, well, the amusement is as innocent as it is stupid. Mr. Commissioner TEUTER often borrows one of the noble steeds. I wonder whether Mr. Commissioner CAMPBELL will do so when he comes here. Talking of amusements, I may say that the HARPER-LEFFLER Company intend to combine concerts with digging. I am afraid that the pick will spoil Mr. HARPER'S hand for the violoncello. But no man can come here and resist the fascination of diamond-digging. As another illustration—drawn from recreations—showing the state of mind of some diggers, let me tell you that the other day a lot of fine-spirited men enjoyed themselves at the Scotch game of putting the stone, only instead of a stone they used a Yorkshire ham. The Zulus, of whom there are hundreds here, help the camp to a laugh. They are lively fellows, always ready, of a Saturday evening or a Sunday afternoon, to dance a war-dance and sing a war-song. As they go in very undress, the capers they cut are remarkable. I hear that skittles are on their way from Natal. I predict tremendous success for skittles. Life here is so rough, rude and dismal that anything is hailed as a relief. If the London monument could be put down on the diggings, its staircase would be choked with crowds at half a crown a climb."

Coal Tar and Civilization.

"THIS is no longer an age in which an industry requires many years for its creation, and still longer time for its development and expansion." So writes Dr. HOFFMAN, the remark being called forth by the wonderfully rapid growth of the utilization of coal-tar residues in the direction of the manufacture of dyes, as evidenced by the French Exposition of 1867. Not very many years since chemical industry was a narrow, circumscribed field. Each new raw material employed, each new method of treatment of that material and the composition of the product of that method of treatment, were all invested with the densest possible mystery. The application of the science to art, that beautiful system of technology, which is alike the wonder of and the originator of our gigantic civilization, was dwarfed in its infancy by this atmosphere of pure trade. Its foster-parents were shrewd, far-seeing men, by whom each new research of the so-called theoretical chemist was submitted to the crucial test of a purely monetary result. What the crucible and the alembic of science brought out was quietly tried in the furnace and still of trade, and then worked to the development of a profitable monopoly, drawing its nourishment always from secrecy, and frequently fostered by special legislative enactment, by almost universal ignorance, and by guilds or peculiar systems of organized labor.

But the theoretical chemist has all nature for his field. The wide range of his inquiries, his multitudinous researches, and their consequent vast accumulation of novelties and facts, together with the systematic arrangement of these, broke down the thick wall of mystery surrounding the operations of the manufacturer, and let in a flood of light upon the darkness of his workshop. These systematically arranged facts became the starting-points for the investigations, researches, and experiments, "entered upon by the philosopher in the hope of advancing scientific progress, and by the manufacturer with the expectation of reaping a material benefit. From these multiplied and diverse efforts, these incessant labors of an army of workers, arises an industry which has no sooner sprung into existence than it becomes important and prosperous." It spreads and ramifies throughout the whole civilized world—touching, mayhap, on the verge of the barbaric world—and unifies all nations by a bond of identity of pursuits and similarity of interests.

No more apt illustration of these principles can be found than that presented by the gigantic industry which is the outgrowth of the production of the ordinary soda-ash. In 1792 France found herself cut off from her extraneous sources of supply of carbonate of soda, and forced to depend upon the limited amount to be extracted from the ashes of the sea-weed of her coast. The hum of the busy wheels of a thousand industries began to be hushed. The trades of the glass-maker and the soap-boiler began to languish, when France, for the time, became independent of the rest of the world by the efforts of one man to accomplish in the furnace of his workshop what the plant did in the great laboratory of the ocean. Carbonate of soda, or soda-ash, became, through the experiments and applications of LE BLANC, an assured and certain product, whose preparation hinged upon and was limited only by the abundance of three of nature's widest spread reagents—salt, lime and sulphur. And after a lapse of but few years, a neighboring State distances in its manufacture that in which the discovery is made, whilst others are travelling almost abreast. Old arts have revived and are flourishing, and new industries have sprung into existence, and with vigorous strides reaching the goal of assured success and prosperity.

In 1792, a Mr. WILLIAM MURDOCH, of Redruth, in Cornwall, for the first time used the gas distilled from coal in iron retorts, for the purpose of illumination, conveying the same in metal pipes for the distance of seventy feet. What a magnificent industry has grown from this experiment, dating back less than a century, is too familiar and patent for comment. But the development of gas manufacture has ministered to civilization in other ways than by simply furnishing us with the luxury of an elegant artificial light. It has given birth to a numerous progeny of rare utility in the present, and of rich promise for the future.

The youngest of these children dates its birth back to 1856. In August of that year a young investigator of ample resources produced indirectly from the waste tar product a new dye, since called mauveine, which two years subsequently he first manufactured on an industrial scale. From coal-tar was derived benzol, and from benzol could be produced aniline—the founder of a long line of handsome and interesting dye materials, whose production had increased so rapidly that in only five years from the date of the discovery the annual value of the trade founded on them was more than two millions of dollars. At the present time the value of the tinctorial products from the waste materials of the gas works, and other aimilar industries based on the distillation of coal, is not much less than ten millions of dollars per year, accompanied by important improvements in modes of manufacture, and in quality and cost of products.

Whilst PERKIN was struggling in England for two years to overcome the difficulties and to surmount the obstacles which beset and accompany the technical realization of all new discoveries, in France several manufactories had already started for the manufacture of mauveine by a process but slightly modified from that revealed in the original patent granted to the English discoverer. The discovery—the enunciation of the idea—was of British origin, the practical embodiment of it was the offspring of French ingenuity. Looking only at the condition of the industry at that time in France and England, one would imagine and believe that its origin was purely in the first named, and that it had only been transplanted, and this, too, with but few hopes for, and signs of, a vigorous growth in the last.

Three years after PERKIN'S discovery, aniline red was first manufactured at Lyons, and almost simultaneous with its production here, it was manufactured in Glasgow. Aniline blue was brought out in 1860, and in less than a twelvemonth, so great was the demand for it, that ten manufactories, distributed throughout England, France, Germany, and Switzerland, were necessary to meet the requirements of this vigorous young trade.

One of the most remarkable and unique features of this new industry was the change it induced in the direction of the traffic in tinctorial products. The West had been subservient to the East. The tropical and sub-tropical floras of Africa and Asia had been the sources whence very many of our dye-stuffs had found their way into the workshops and vats of Europe. But the young trade in aniline colors first removed the necessity of importing many coloring principles. Subsequently it sent its fine products to eastern lands, finding a market for them in China, India, and Japan. This was indeed a change in the history of dye material. Chemistry is emphatically revolutionary, and she now, to use again the language of the learned and able HOFFMAN, "victorious, dispossessed the sun of a monopoly which it had hitherto always enjoyed; at the beginning of this century, when mythological language was in vogue, it would have been said that Minerva had triumphed over Apollo."

At the close of the year 1862, and the beginning of the following year, numerous and important additions were made to the list of aniline colors. Then were discovered the greens, blacks, and violets, and the true constitution and composition of these, as well as their predecessors, were fully and scientifically made out. Additions were thus made to purely chemical knowledge, whilst technology had placed in her hands new means of preparing the colors, and had suggested to her new sources of raw material, should the old run short. More particular attention was directed towards the saving of the crude coal-tar. Apparatus was devised that the amount of raw material to be obtained from coal should be increased, while, at the same time, the valued coke for iron furnaces and other metallurgical operations should be of the requisite good quality. Thus, while the products were being improved in quality, and our knowledge of their constitution was being extended, the industry of the raw material was receiving so much attention as soon to affect perceptibly the cost of the finished products. So, also, the accompaniments of the means and methods of using these coal-tar colors began to be studied out. The dyer and calico-printer were at a loss in applying them till their properties had been more fully studied. Then the proper solvents and mordants were decided upon, and the colors which had found favor for their brilliancy and beauty now became valued for their service, cheapness, and general utility.

There is a discovery of considerable interest which may justly be regarded as the outgrowth of the coal-tar color industry, for it originated from the impetus given to the study and investigation of the nature and contents of the coal-tar by this rising trade. About two years since, two continental philosophers found that from anthracene—one of the components of coal-tar—they could produce a substance identical in character, behavior, and composition, with the coloring principle of the madder-plant. Probably in this discovery are the germs of an industry even more grand and important than that of the anilines, for madder is the great and reliable tinctorial agent of the dyer and calico-printer. Already the commercial production of this artificial madder-principle has been commenced, and the sun is again rivalled by the potency of the wand of that arch-magician, the chemist. And the mere cheapening of the madder dye must be looked upon as of a secondary and subordinate importance, when it is considered that hundreds of acres now devoted to the cultivation of the plant can be relieved to grow bread materials for thousands of the toilers of the world. Thus arises an indirect benefit to humanity of far grander significance even than the immediate utility of the practical application of the discovery of the two German chemists. The world will yet owe these investigators a huge debt of gratitude.

Besides their uses in the more striking arts of dyeing and printing on calicoes, the coal-tar colors have minor applications, which may be tempted to overlook or forget. The perfumer has advantageously substituted them for the injurious metallic pigments he so long employed for coloring his pomades and other products. The manufacturer of inks for typographic and lithographic purposes, has multiplied his shades and tints to an almost innumerable degree through their agency. The soluble aniline replaced the ultra-marine and metallic oxides used to blue the pulp, or give a superficial color to the finished product of the paper-maker. Stationers find use for the anilines for coloring their wafers, and for their fancy inks. Confectioners manufacture "raspberry vinegar" through the use of some of them. The laundress finds in the blues a good substitute for the more expensive indigo. And finally, in a word, in a thousand almost unknown and unappreciated ways, they have spread through many of the minor manufacturing processes, and have thus intimately connected themselves with domestic life, outcropping in its comforts as well as its luxuries.

Perhaps, excepting the improvement in the manufacture of soda-ash, suggested and carried out by LE BLANC, there is no more striking chemical industry than this production, from the crude, waste tar of the gas-works, of so many forms of brilliant dyes. It must seem to those uninitiated into the laws of chemical union and into the nature of chemical changes, rather

the work of a powerful magician than the mere chemical investigator. And yet from it—and not only from it either, but from the whole range of chemical technology—can be garnered this harvest of useful instruction. The theoretical chemist, so-called, is, after all, the true, practical, industrial chemist, and practical chemistry, as generally understood, can advance only by a due regard and appreciation of what is deridingly styled theory.

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110,815.—GLASS LAMP.—John Adams, Birmingham, Pa.

110,816, antedated December 30, 1870.—LAMP.—Albert Albertson, Jersey City, N. J.

110,817.—STOVE-PIPE SHELF.—Samuel J. Anderson, Cazenovia, N. Y.

110,818.—LIFTING-JACK.—Orren A. Anthony, Mayfield, N. Y.

110,819.—CASE FOR REED ORGANS.—Charles Edwin Bacon, Buffalo, N. Y.

110,820.—BED, CUSHION, AND OTHER UPHOLSEERING.—Horace H. Barnes, Hoosick Falls, N. Y.

110,821.—ADJUSTABLE DOOR-FASTENER.—Lucius Philetus Barnes, Fitchburg, Mass.

110,822.—MACHINE FOR DRILLING SHUTTLES.—Charles E. Billings, Hartford, Conn.

110,823.—ADJUSTABLE LOCK-COUPLING FOR VEHICLES.—George G. Burgess, Grafton, Ohio.

110,824.—COMPOUND FOR STOVE-POLISH.—Robert E. Cherrington, South Boston, Mass.

110,825.—WASHING-MACHINE.—Sarah J. Clark, Richmond, Ind.

110,826.—INSULATED BOLT FOR RAILWAY-RAILS.—John W. Cochran, New York, N. Y.

110,827.—MARINERS' SOUND-INDICATOR.—James Cochrane, New York, N. Y.

110,828.—RUBBER PAD FOR HORSE-SHOES.—Daniel L. Corbin, Friendship, N. Y.

110,829.—SELF-ACTING SEWER-BASIN TRAP.—Matthew K. Couzens, Yonkers, N. Y.

110,830.—SPRING-BOTTOM FOR WAGON BODIES.—Ephraim D. Cramer, Hackettstown, N. J.

110,831.—WASHING MACHINE.—Albert O. Crane, Boston, Mass.

110,832.—COTTON-SEED PLANTER AND GUANO-DISTRIBUTER.—William W. Croom, Montgomery, Ala.

110,833.—MANUFACTURE OF ARTICLES FROM PAPER PULP.—Francis Curtis, Foxborough, Mass., assignor to David Scrymgeour, same place.

110,834.—FEED-CUTTER.—William Dahlem, Madison, Ind.

110,835.—STEAM-ENGINE VALVE.—Charles P. Deane, Springfield, Mass,

110,836.—CULTIVATOR.—William A. Dryden, Monmouth, Ill., assignor to himself and John M. Turnbull, same place.

110,837.—CORN-PLANTER.—Young I. Edwards, Trenton, Tenn.

110,838.—VENLILATOR.—William Ennis, New York, N. Y.

110,839.—DRIVE-SCREW.—David F. Fetter, New York, N. Y.

110,840.—SHOE.—John W. Fisher, Albany, N. Y.

110,841, antedated January 7, 1871.—BINDING ATTACHMENT FOR HARVESTERS.—Abraham Freed and Jonathan Snook, La Porte, Ind.

110,842.—CONNECTING-ROD.—Wilkerson G. Freeman, Richmond, Va.

110,843.—MILL-BUSH.—Hamlin F. Frisbie, Danville, Ill.

110,844.—FIRE-SCREEN AND STAND.—Hugo O. Fritsch, New York, N. Y.

110,845.—CLARIOTET.—Anton Fritsche, New York, N. Y.

110,846, antedated December 30, 1770.—LAMP-BURNER.—George P. Euller, Humphrey, N. Y.

110,847, antedated December 29, 1870.—HIDE-WORKING MACHINE.—Marcus B. Gould, Buffalo, N. Y., assignor to himself and Winfield S. Shaw, same place.

110,848, antedated January 6, 1871.—HAMES-FASTENING.—Hugh B. Grumling, Grant, Pa.

110,849.—HAY-PRESS.—Finlay F. Hamilton, Green Bay, Wis.

110,850.—STEAM-PUMP.—Thomas Harrington, Pittsburg, Pa.

110,851.—FIRE-ESCBPE.—Edward J. Hudson, Golconda, Ill.

110,852.—ARTIFICIAL STONE FOR PAVEMENTS, WALKS, FLOORS, &c.—Carlcton B. Hutchins, Ann Arbor, Mich.

110,853.—SULKY CULTIVATOR.—Hugh P. Jordan, Victoria, Texas.

110,854.—BED-BOTTOM.—William B. Judson, Poughkeepsie, N. Y, assignor to J. P. Nelson, Jr., same place.

110,855.—NEEDLE-SETTER AND THREADER FOR SEWING-MACHINES.—Jacob Karr, Washington, D. C.

110,856.—DEVICE FOR SECURING THE TINES OF HAY-TEDDERS.—Delanoy Kennedy, New York, N. Y.

110,857.—APPARATUS FOR GENERATING AND BURNING VAPOR FROM HYDROCARBONS.—Joshua Kidd, New York, N. Y.

110,858.—ROLLER-SKATE.—Matthew H. Kimball, San Francisco, Cal., assignor to himself and James Garvey, same place.

110,859, antedated December 6, 1870.—ROOFING-TILE PRESS.—John Koehler, Warren, Ohio.

110,860.—PLOWSHARE.—John Lane, Chicago, Ill., assignor to Hapgood & Co., same place.

110,861.—GRAVEL AND SAND-HEATER.—Philip Le Goullon, Pittsburg, Pa.

110,862.—STEAM GENERATOR.—Mirabeau N. Lynn, New Albany, Ind.

110,863.—CARRIAGE CURTAIN FASTENER.—William H. Morse, West Newbury, Mass.

110,864.—HAND-STAMP.—Marcus P. Norton, Troy, N. Y., assignor to Helen M. Ingalls, same place.

110,865.—TRACTION ENGINE.—Treat T. Prosser, Chicago, Ill., assignor to himself, Henry Waller, and W. S. Waller, same place.

110,866.—APPARETUS FOR SUPPLYING NAPTHA TO VAPOR-BURNING STREET LAMPS.—Frances M. Randall, Greenburg, N. Y.

110,867.—PICTURE-NAIL.—Thomas C. Richards, New York, N. Y.

110,868.—LUBRICATOR.—Joseph Richter, Cincinnati, Ohio.

110,869, antedated December 31, 1870.—DENTAL LATHE.—Elias C. Rishel, White Haven, Pa.

110,870.—DRAWER FOR STORES.—Robert Jordan Roberts, New York, N. Y.

110,871.—LATHE FOR TURNING WOOD.—Ira Rood, Elyria, Ohio.

110,872.—MAN-HOLE PLATE FOR STEAM BOILERS.—John D. Samson, Perria, Ill.

110,873.—APPARATUS FOR BOILING AND TREATING PAPER STOCK.—George Sinclair, Leith, Scotland.

110,874.—PISTON.—Andrew H. Smith, New York, N. Y.

110,875.—CEREMONIAL BELL.—John W. Smith, Keokuk, Iowa.

110,876.—HORSE HAY-RAKE.—Joshua C. Stoddard, Worcester, Mass.

110,877.—LIQUID METER.—William G. Stuart, Chicopee, Mass.

110,878.—METHOD OF COATING SAD-IRONS, &c.—William H. Towers, Boston, Mass.

110,879.—THIMBLE.—Edward B. Towle, Newburyport, Mass.

110,880.—CAR-COUPLING.—George H. Weeks, Allegan, Mich.

110,881.—METALLIC CARTRIDGE.—Rollin White, Lowell, Mass.

110,882.—CURBING FOR EXCAVATIONS.—Henry Whitestone, Louisville, Ky.

110,883.—FASTENING FOR THE TIPS OF BILLIARD CUES.—Oliver C. Wilbur, Jr., Providence, R. I.

110,884.—BOILER FOR HEATING.—John G. Wilson, New York, N. Y.

110,885.—WASHING-MACHINE.—Ananias Z. Young, Liberty, Miss.

110,886.—SNOW-SHOVEL.—Albert Q. Adams, Wallingford, Vt.

110,887.—CHARGER FOR SHOT-POUCHES.—Thomas W. Allen, Waterbury, Conn.

110,888.—FENCE.—Collester M. Ballard and Myron Morehouse, Johnsonburg, N. Y.

110,889.—HOT-AIR FURNACE.—William D. Bartlett, Amesbury, Mass.

110,890.—SPARK-ARRESTER.—Darwin Beach, Oshkosh, Wis.

110,891.—EMBOSSING HAT-LININGS.—Thomas W. Bracher, New York, N. Y.

110,892.—ANIMAL-POWER APPARATUS.—Orville M. Brock, Monroeton, Pa., assignor to James H. Hawes and George Hawes, same place.

110,893.—HAY-TEDDER.—Alzirus Brown, Worcester, Mass.

110,894.—BEE-HIVE.—Gustavus Adolphus Brown and Francis Adams McCallen, Russellville, Ky.

110,895.—FLUTING-MACHINE.—Abner Burbank, Rochester, N. Y.

110,896.—GRAIN-DRIER.—Lewis S. Chichester, Brooklyn, N. Y.

110,897.—CHURN.—Jacob Clark, Brush Valley, Pa.

110,898.—VENTILATOR OR BLOWER.—John F. Collins, New York, N. Y.

110,899.—FENCE.—Thomas C. Collins, Little Hockhocking, Ohio.

110,900.—PARLOR-ORGAN.—James Cordley, Adrian, Mich.

110,901.—RAILWAY CAR PLATFORM.—Rensselaer A. Cowell, Cleveland, Ohio.

110,902.—CHURN.—John Cram, Chicago, Ill., assignor to himself and John S. Cram, same place.

110,903.—LATHE-CHUCK.—Austin F. Cushman, Hartford, Conn.

110,904.—LOOM.—Hilas D. Davis, North Andover, Mass.

110,905.—VENTILATOR.—Edward Mortimore Deey, New York, N. Y.

110,906.—RAILROAD-CAR VENTILATOR.—John M. Dexter, Elmira, N. Y.

110,907.—APPARATUS FOR DYING FABRICS.—Thomas Messenger Drown, Philadelphia, Pa., assignor to W. A. Drown, same place.

110,908.—PROPELLER.—Edgar Eltinge and John C. Brodhead, Kingston, N. Y.

110,909.—BEE-HIVE.—Thomas S. Engledow, Cedar Falls, Iowa.

110,910.—FENCE.—Admiral Faulkner, Mount Pleasant, Iowa.

110,911.—SHAFT-TUG.—Kasson Frazer, Syracuse, N. Y.

110,912.—ROTARY ENGINE.—Samuel Gibson, Lancaster, assignor to himself, Alexander L. Hayes, same place, and J. W. G. Wierman, York, Pa.

110,913.—SHUTTER-FASTENER.—Ebenezer A. Goodes, Philadelphia, Pa.

110,914.—WRENCH.—John Goodin, Joliet, Ill.

110,915.—AIR-ENGINE OR FAN-BLOWER.—Gardner C. Hawkins, Boston, Mass.

110,916.—COFFEE-ROASTER.—Louis Houcke, Springfield, Ohio.

110,917.—BROOM-HOLDER.—Zadok Howe, Lowell, Mich.

110,918.—JOINT FOR FRAMES OF FOLDING UMBRELLAS.—Algernon S. Hubbell, Norwich, Conn.

110,919.—SAD-IRON.—Hubert R. Ives, New Haven, Conn.

110,920.—AUGER-HANDLE.—William A. Ives, New Haven, Conn.

110,921.—HAT.—Jeremiah Charlton, Mass.

110,922.—STREET LAMP.—John F. Kerns, Baltimore, Md.

110,923.—LOUNGE.—Oswald Kubitschky, Chicago, Ill.

110,924.—PLOW.—John M. Leonard, Marshall, Mich.

110,925.—BILLIARD-TATLE.—William Lochhead, Brooklyn, N. Y.

110,926.—SLIDING STOP-VALVE.—Henry G. Ludlow, 2d, Troy, N. Y., assignor to the Ludlow Valve Manufacturing Company, same place.

110,927.—GRINDING-MILL.—Isaac Mayfield and William D. Mayfield, Mayfield, Ky.

110,928.—REGULATING THE DISCHARGE OF WATER FROM PUMPS.—John Mayher, East Hampton, Mass.

110,929.—ROTARY BLOWER.—Henry C. McIlwain and Alonzo Brumfiel, Connersville, Ind.

110,930, antedated December 30, 1870.—VALVE FOR OIL PUMPS.—Henry Millingar, Pittsburg, Pa.

110,931.—CRADLE.—Albert H. Ordway, Haverhill, Mass.

110,932.—NECK YOKE OF HARNESS.—Albert Parliman, Palmyra, N. Y.

110,933.—STEAM VACUUM PUMP.—James H. Pattee and Hugh J. Graham, Monmouth, Ill.

110,934.—SPRING FOR WAGONS AND CARRIAGES.—Samuel J. Pearsall and Silas P. Briggs, Saratoga Springs, N. Y.

110,935.—VALVE-GEAR.—William R. Reece, Tremont, Pa., assignor to himself and "The Iron Manufacturing and Coal Company," same place.

110,936.—PUMP.—Nathaniel P. Sheldon, San Francisco, assignor to himself and William H. Hall, of San Jose, Cal.

110,937.—BEE-HIVE.—Luther S. Sisson, West Edmeston, N. Y.

110,938.—UNIVERSAL COG-WHEEL COUPLING.—Egbert Smith, Adams County, Ill., assignor to himself and Myron Sherrick, same place.

110,939.—CURTAIN FIXTURE.—William H. Tambling, Eleroy, Ill.

110,940.—PIANO.—William F. Ulman, Boston, Mass.

110,941.—BOOK-CASE FOR SCHOOLS, &c.—Peter T. Vannice, Kewanee, Ill.

110,942.—VESSEL FOR CARRYING LIQUID CARGOES.—William Gray Warden, Philadelphia, Pa.

110,943.—CUT-OFF FOR STEAM ENGINES.—William Watts and Frederick A. Phelps, Newark, N. J.

110,944.—MACHINE FOR BOARDING LEATHER.—Urban R. Williams and William P. Martin, Salem, Mass.

110,945.—PRESSER AND STITCH-DIVIDER FOR SEWING-MACHINES.—Alfred S. Woodward, New York, N. Y.

110,946.—APPARATUS AND PROCESSES FOR GENERATING AND BURNING VAPOR FUEL.—Alfred J. Works, New York, N. Y., and Henry A. Daniels, Washington, D. C., assignors to the United States Vapor-Fuel Company, New York City.

110,947.—PAPER-POLISHING MACHINE.—Abram Wright and George F. Wright, Clinton, Mass., assignors to themselves and John H. McNabb, same place.

REISSUES.

4,230.—DEVICE FOR BAKING BREAD.—Abram L Quackenbush and Guilford Hawn, Fort Plain, N. Y.—Patent No. 99,109, dated January 25, 1870.

4,231.—CULTIVATOR.—Benjamin Tinkham, Cameron, assignor to Hapgood & Co., Chicago, Ill.—Patent No. 30,987, dated December 11, 1860.

DESIGNS.

4,563.—TYPE.—Andrew Gilbert, Boston, Mass.

4,564.—COAL-HOD.—Christian Linder, Nauffen, Wurtemberg.

4,565.—SOLDIER'S MONUMENT.—Lewis A. Tifft, Springfield, Mass.

4,566.—COMBINED PENCIL AND RECEPTACLE.—Horace J. Wickham, Manchester, Conn., assignor to Joseph Reckendorfer, New York City.

TRADE-MARKS.

128.—PAINT.—Averill Chemical Paint Company, New York, N. Y., and Cleveland, Ohio.

129.—LIQUID CHEMICAL PAINT.—Averill Chemical Paint Company, New York, N. Y., and Cleveland, Ohio.

130.—CHEMICAL PAINT.—Averill Chemical Paint Company, New York, N. Y., and Cleveland, Ohio.

131.—AGRICULTURAL FORKS.—Batcheller Manufacturing Company, New York, N. Y.

132.—CARPETS.—Lowell Manufacturing Company, Lowell, Mass.

133.—STEAM ENGINE.—Joel Sharp, Salem, Ohio.

134.—FRINGES, RIBBONS, AND TRIMMINGS OF SILK.—Silbermann, Heinemann & Co., New York, N. Y.

Graphite.

GRAPHITE, or plumbago, has been found in gneiss, mica slates, clay slates, limestones, and a variety of other rocks of different geological periods. Its origin has long been a matter of conjecture, and scientific men have not been able to agree upon it. Professor WAGNER ascribes it to the decomposition of cyanogen and of the cyanides. The black mass which sometimes separates from hydrocyanic acid, on being washed in nitric acid and dried, is found to consist of scales of graphite Dr. WAGNER infers from this that the artificial graphite that is formed on the cooling of many varieties of iron, has its origin in the same source, namely, cyanogen. It is not the carbon which is held in solution in the melted iron, but the cyanogen compounds, that give rise to the graphite. In the manufacture of soda by LE BLANC's process there is always a quantity of graphite formed, which is derived from the decomposed cyanogen compounds, and in some of the large establishments of Bohemia practical application is made of this incidental product in the manufacture of lead pencils. This theory of the origin of black-lead is worthy of attention, as it may lead to cheap methods for the artificial production of that valuable substance, and at the same time help to explain many difficult geological questions.

Summit County in 1871.

THERE can be little doubt but that Summit county is to be one of the richest mining counties in Colorado, and that from this time forward she is to receive her full share of population and wealth from the new comers into our Territory.

The mines of this county are mainly placer deposits, and are, as a rule, readily worked, and seldom fail to yield abundantly. During the last summer and autumn, in addition to opening ground already known to contain gold, there has been much prospecting done, and large areas of ground, formerly supposed to be worthless, have been proved to contain gold in paying quantities. Extensive improvements in the shape of large ditches have been projected and some of them built; this, together with the consolidation of many claims and the purchase of a large amount of good ground by capitalists, gives promise of a busy season in Summit during 1871.

River mining, in such streams as the Blue and Swan rivers, is destined to become the source of untold millions, and when mining is carried on in Summit with the energy and vigor displayed in like pursuits in California, there can be no doubt but that results equally as large as are obtained in the placer mining camps of that State, will be made in Summit county The gold is certainly there, and the supply of water is ample in ordinary seasons.

Whatever may be the extent and richness of the lodes now discovered, or to be discovered in the future within the limits of Summit county, and we think that many valuable gold lodes are yet to be found in that county, it is very evident that the prosperity of Summit is, for the present at least, very much dependent on the extent and vigor with which her placer deposits of gold are worked. Commencing on the very head waters of Swan river, and extending around to the head of the Blue, and down that stream for at least 20 miles, there is almost one continuous placer deposit, containing gold in paying quantities. This ground, of course, varies in richness; it is not all as rich as some of the favored spots, such, for instance, as Galena gulch (WILLIAMS, LOVELL & Co.'s ground), or CARTER'S ground in American and Humbug gulch, or parts of French gulch, yet very much of the area mentioned is good for $5 a day for each honest day's work done, with the strong probability of ground being opened that will pay very much larger wages.

The ground of WILLIAMS, LOVELL & Co. at the mouth of Galena gulch, is a very marked instance of what a little energy and industry will effect. This ground has been neglected for years, and it was reserved for the present owners of the ground to prove that it is one of the richest spots of gulch mining territory in Summit county. It is most eligibly situated, has a good dump, and bids fair to become the equal of any of the crack ground in the county. It has paid remarkably well last season, and will probably do better during the coming year. A claim paying as this one has, not less than $15 a day to the man, is certainly a good piece of property, even in Summit county, where ground that pays but $5 a day is considered to be rather too poor to work with profit.

It is expected that with the emigration that Summit county will certainly receive there will henceforth be a greater activity in mining matters than heretofore, and that other localities, such for instance as the Eagle river and its tributaries, will be discovered to be auriferous. What is necessary for the permanent prosperity of Summit is to have lode mining carried on in other parts of the county beside Snake river.

Time will doubtless prove that there are rich and valuable gold, and probably silver, lodes in other parts of the county, and that the extent and richness of the Snake river mines will be equalled, if not excelled. Everything considered, the outlook for 1871 for Summit county is satisfactory and promises well.

When the time shall come when the farming lands of Summit county are cultivated, and when better means of communication than now exist shall have been made with the outside world, there can be no doubt but that Summit will not only be the largest, but the richest and most populous, of any of the mining counties of Colorado.—*Colorado Miner.*

Bruckner vs. Stetefeldt.

RIVAL SILVER PROCESSES.

DEAR MINER:—Inasmuch as the Stetefeldt furnace is attracting very general attention in Nevada, and as its introduction into Clear Creek county is not improbable, I would beg leave to offer, through your columns, some remarks on the great rival of the Stetefeldt furnace, the Bruckner cylinder; and to make a few comparisons between the two, as means of roasting and chlorodizing the ores. My excuse for taking up so much of your space must be the vital interest that any method of roasting ores is to the community.

In the first place, then, let us compare the relative cost of the two: It costs, in Nevada, about $10,000, gold, to erect a Stetefeldt furnace of the capacity of thirty tons of ore per day. To treat this amount of ore daily by the Bruckner process it would require six cylinders, which can be built, and put on the rollers, ready for work, at a cost of $1,200 currency, each; with a very strong probability that they would not cost over $1,000 each; but let us say they will cost $1,200 each, and we have, as the total cost of the cylinders to roast thirty tons per day, the sum of $7,200. And, again, let us say that it would cost as much in currency to erect a given size of the Stetefeldt furnace in Colorado as it costs gold in Nevada (and we have good reason to believe it will cost more), and we have a saving of $2,800, in the first cost of machinery, in favor of the cylinder over the furnace.

We must, however, consider that the first cost of a given machine is, in a great degree, subordinate to the amount of economy atainable by its use, and the question as to the relative cost of operating the cylinder and furnace must also be considered.

The item of labor is first on the list. I find that the advocates of the Stetefeldt furnace claim that it requires, in a 30-ton furnace, "eight men only (2 to feed, 3 to fire, and 3 to draw and cool the roasted ore)," to run the furnace for twenty-four hours. Now, with six cylinders it will not take over one man to three cylinders, or four men in twenty-four hours; but say it takes one man to two cylinders, and I believe that the two-cylinder mill of HUEPEDEN & Co., in Georgetown, has but one man on "a shift," who attends to both cylinders, and then we have six men in twenty-four hours as the amount of labor required to roast 30 tons of ore per day in the Bruckner cylinder. A gain of two men per day in favor of the cylinder over the furnace.

Next as to fuel. The Stetefeldt furnace uses four cords of wood every twenty-four hours, being at the rate of one cord of wood for every 7½ tons of ore treated. The six Bruckner cylinders will consume ¾ of a cord each in twenty-four hours, or 4½ cords in all. being at the rate of one cord of wood to each 6⅔ tons of ore treated, and it is in this respect alone that I can discover any advantage by the adoption of the furnace in preference to the cylinder. This amounts to the saving of ½ of a cord of wood in twenty-four hours, equal to a saving of less than 10 per cent.

Regarding the amount of salt used, no just comparison can be made, as this depends on the kind and richness of the ore treated rather than the machine in which it is roasted, and we will have to take it for granted that the cylinder and furnace are equal on this point.

It is claimed for the Stetefeldt furnace that by its use silver ore should never be chloridized below 90 per cent. I believe that accurate working would show the Bruckner cylinder to be fully equal to the furnace in chloridizing capacity, and capable of doing fully as good work. At all events, the mills in Austin, Nevada, return to customers but 80 per cent. of the assay value of their ores, and we doubt if any mill using the Stetefeldt furnace does any better. The general public can, of course, never expect to know the *exact* percentage of bullion obtained from their ores, and while we may all suspect that the Stetefeldt furnace or the Bruckner cylinder gets more than 80 per cent., or even know such to be the case, our only guide as to the relative value of two machines as chloridizers must lie in a test run of each, both using the same ore.

A few of the prominent points wherein the Bruckner cylinder is manifestly superior to the Stetefeldt furnace suggest themselves to me; they are as follows: First, in the readiness with which a mill using the cylinders can be moved from one locality to another, which is totally out of the question in the case of the furnace, which, when once built, must stay in the one spot, as it would be cheaper to build an entirely new furnace than to attempt to tear an old one down to rebuild elsewhere. Second, in the greater economy in fuel by the use of the cylinder in a district where the ore supply is variable and not constant. If, for instance, the supply of ore sent to a Stetefeldt furnace should from any cause—and such things as snow storms, accidents to teams, etc., are common in all mining countries—be decreased by one-half, the same number of men to run the furnaces must be kept employed, and the same amount of fuel used, as if the furnace were running to its full capacity; whereas, if the cylinders were used, but one-half of them need be run, and the same saving could be made in the items of fuel and labor. Third, it costs but from $150 to $250 per cylinder to obtain the right to use them, while the Stetefeld furnace is costly, the owners of that patent demanding, I believe, either $2 per ton royalty for each ton of ore treated, or else a large sum for the right to use the furnace. Now, I think that I have shown that the difference in cost of erecting the cylinders for a 30-ton mill over the cost of building a 30-ton furnace is $2,800, which is sufficient to pay for the right to use the cylinders and leave something over.

It is true that these cylinders require power to run them; but as power of some kind is a necessity in the use of either the cylinder or the furnace, this item is not much. It amounts to but, say, six horse power extra, which requires only a little extra fuel and no extra attendance.

I am not, dear *Miner*, the fortunate owner of a mill; I have have no use for either the cylinder or the furnace, and am therefore prepared to speak what I consider the facts of the case in an unprejudiced state of mind. One thing I am aware of, however, and that is, in order to secure to the fullest extent the economy to be gained by the use of any furnace or cylinder, a full and constant supply of ore must be furnished a mill wherein it is used. And I would therefore suggest to the miners of this district, that before any other furnace, whether it be STETEFELDT'S, ABEY'S, or BRUCKNER'S, can hope to treat ores as cheaply here as they might be, a full supply of ore must be furnished. By a full supply I do not mean enough to keep Mr. STEWART'S or HUEPEDEN & Co.'s mills running as they now run, by fits and starts and not up to one-half of their aggregate capacity, but enough to have these mills fully, steadily and constantly employed, from the rising of the sun on Monday morning to the setting of the sun on Saturday night, and from the beginning of the year to the end thereof. Once establish this state of affairs, and we will venture the assertion that, neither in the price of treating ore, nor in the percentage of the assay value returned to customers, will the miners of Clear Creek county have any cause of complaint, or the miners of Nevada any superiority. "B."—*Colorado Miner.*

The Channel Islands Telegraph.

DIRECT communication by submarine cable between the Channel Islands and the United Kingdom was opened in December last. It will be remembered that the Channel Islands and the Isle of Man were not included in the original scheme of postal telegraphs, but were brought within it by an Act passed in the last session of Parliament. The Isle of Man has for some months enjoyed the uniform shilling rate, the rate for Isle of Man messages having previously ranged from 2s. 6d. to 3s. 6.; and the Channel Islands, the rate for which by the lines of the Submarine Company via France has hitherto been 6s. 8d. or 7s. 8d., will enjoy the shilling rate from to-day. Moreover, the new lines provide for Guernsey, and will provide for Alderney as well as for Jersey. Up to the present time the last-named island only has had the means of communicating by telegraph.—*Engineering.*

A Fortified London.

THE extraordinary effect in the duration of this war produced by the fortifications of Paris, has drawn the attention of all thoughtful professional men to the subject of fortifying capitals generally. It has also, we are happy to learn, drawn the attention of our own War Office, and it is understood that the Fortification branch there, under Sir F. CHAPMAN and Colonel JERVOIS, C.B., has been directed to prepare a careful scheme for defending London. That the gentlemen who live at ease in Lancashire may not be alarmed, it is well to state that Mr. CARDWELL is not likely to propose any vote on this account, or any one else, to begin a series of Forts Valérien. All that will be done will be to make such a careful study of the hills which enclose this great basin of the Thames in which we live, that we should have a ready-made plan whereby to turn our navvies on to the intrenching of a set of rough field-works, should the Continental fleets and Continental armies unite to imperil our metropolis. In such case, we should have the labor and the guns, and should try to create a big Sebastopol.—*English Army and Navy Gazette.*

American Guns.

WITHIN the last few months an order has been received at the Fort Pitt Foundry, Pittsburg, Pa., from the Navy Department, for twelve 15-inch guns. The first two are to be cast from the same run of metal—one hollow, on the Rodman principle, and the other solid, after the Dahlgren plan—and these, when finished, are to be subjected to an extra proof of 500 charges each, for the purpose of testing the endurance of each class of gun. This will be the first time in the history of ordnance manufacture when a gun of 15-inch calibre has been cast solid, and the results will be watched for with considerable interest by scientific men. If the new principle of construction is approved, it is probable that the government will man the principal forts in the country with guns of this calibre and made after this plan. Recently two officers of the Spanish navy arrived in this country, empowered to negotiate for the purchase of large guns for Morro Castle, in the harbor of Havana. These officers contracted with the Fort Pitt Foundry for the construction of 16-inch, 15-inch, and four 20-inch guns for that famous castle. These cannons are now being completed, and wil be delivered in New York in the course of a couple of months. The manufacture of guns of extremely large calibre, which was brought to great perfection during the war of the Rebellion, is still carried on at the Fort Pitt Foundry, and arrangements will soon be perfected by which guns capable of throwing a larger weight of metal than has ever been projected by powder can be cast and finished in a most perfect manner. It will be remembered that the 15-inch cannon which were used on our monitors during the war were the objects of the greatest curiosity, and when the first 20-inch gun ever cast was mounted at Fort Hamilton, hundreds of our citizens made the journey to see it. If these enormous cannons were regarded with so much curiosity, what will be thought of 30-inch guns, having inside space enough for a small couple to dance a minuet in, mounted on a fortification? Major RODMAN, the distinguished ordnance officer and the inventor of the Rodman gun, has long entertained the idea that 30-inch guns could be be made with almost the same facility as 20-inch could, and he is now arranging for an appropriation to enable him to carry his plan into execution. * * * As 20-inch guns cost about $30,000 each, doubtless 30-inch pieces will cost at least double that sum.—*New York Times.*

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf

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CHARLES ROGERS, Solicitor and Manager.

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A COMPLETE PATENT AGENCY,

and now offer our services in procuring patents in this and foreign countries, and transacting all business relating to the obtaining of patents.

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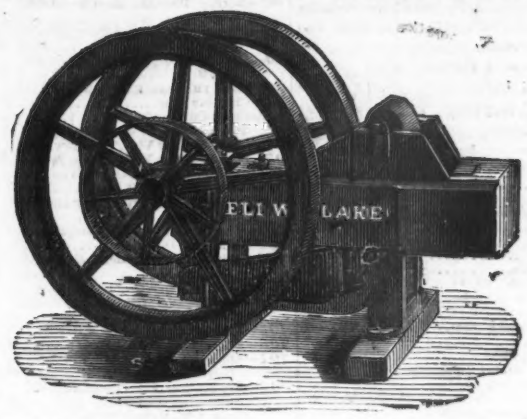

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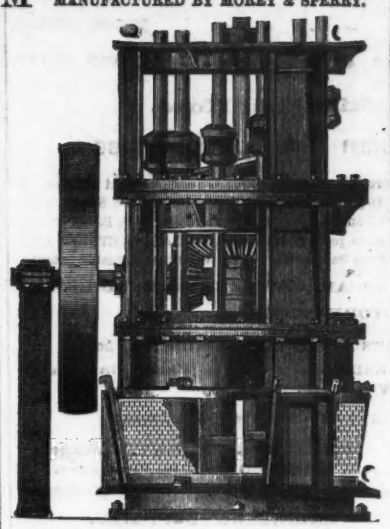

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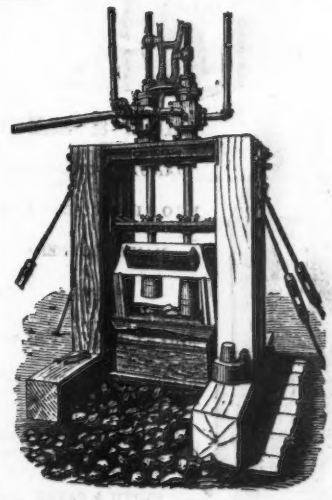

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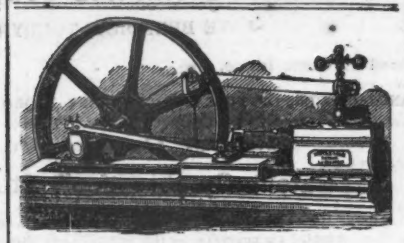

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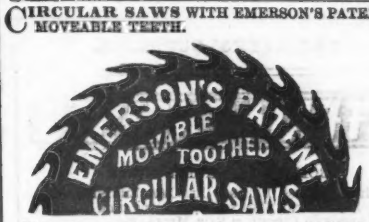

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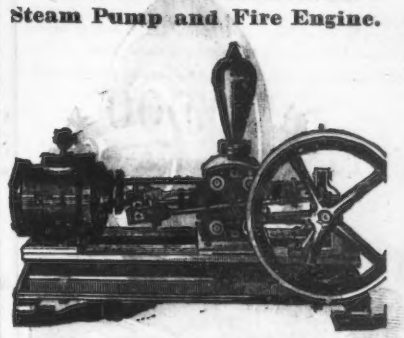

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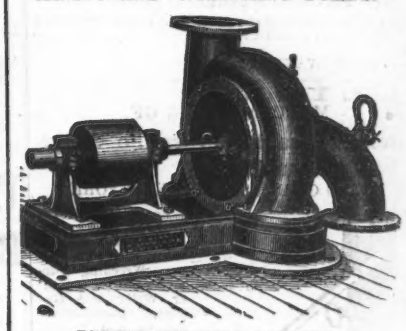

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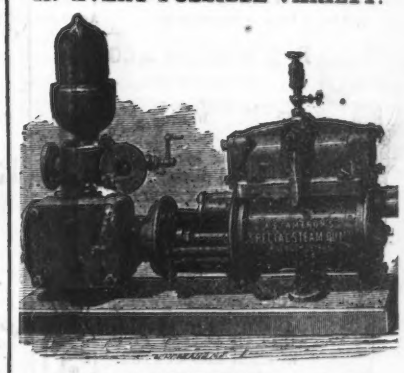

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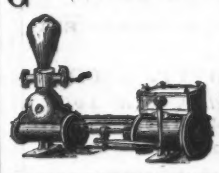

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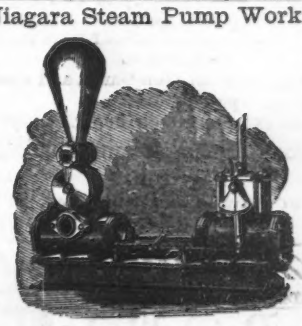

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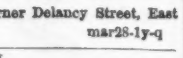

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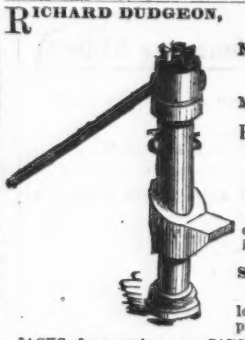

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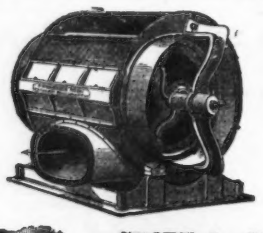

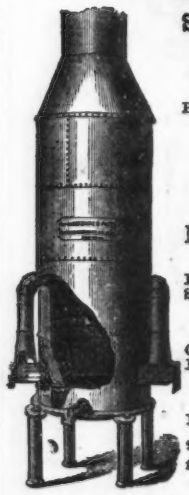

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